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<http://www.ncbi.nlm.nih.gov/entrez>

1: AY207429. Homo sapiens inte...[gi:27501935]

Links

LOCUS AY207429 9803 bp DNA linear PRI 05-JAN-2003
 DEFINITION Homo sapiens interleukin 11 (IL11) gene, complete cds.
 ACCESSION AY207429
 VERSION AY207429.1 GI:27501935
 KEYWORDS .
 SOURCE Homo sapiens (human)
 ORGANISM Homo sapiens
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata;
 Euteleostomi;
 Mammalia; Eutheria; Primates; Catarrhini; Hominidae; Homo.
 REFERENCE 1 (bases 1 to 9803)
 AUTHORS Rieder,M.J., Carrington,D.P., da Ponte,S.H., Hastings,N.C.,
 Ahearn,M.O., Kuldanek,S.A., Rajkumar,N., Toth,E.J., Yi,Q. and
 Nickerson,D.A.
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 Program for Genomic Applications, UW-FHCRC, Seattle, WA (URL:
<http://pga.gs.washington.edu/>).
 FEATURES Location/Qualifiers
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 /replace="g"
 variation 187
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 /replace="t"
 repeat region 282..611
 /rpt_family="Alu"
 /rpt_type=dispersed
 variation 357
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 /replace="c"
 variation 447
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FIGURE 1

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variation      970
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  /product="interleukin 11"
CDS           join(1645..1651,3014..3186,3386..3472,3584..3745,
  5778..5948)
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  /codon_start=1
  /product="interleukin 11"
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  /frequency="0.30"
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  /frequency="0.01"
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FIGURE 1

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<u>variation</u>	4064
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	/gene="IL11"
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	/replace="t"
<u>variation</u>	4802
	/gene="IL11"
	/frequency="0.18"
	/replace="g"
<u>repeat region</u>	5003..5113
	/rpt_family="Alu"
	/rpt_type=dispersed
<u>variation</u>	5108
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<u>variation</u>	5970
	/gene="IL11"
	/frequency="0.01"
	/replace="t"
<u>variation</u>	6068
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	/frequency="0.01"
	/replace="a"
<u>variation</u>	6077
	/gene="IL11"
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	/replace="t"

FIGURE 1

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variation       6092
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variation       6212
/gene="IL11"
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variation       6494
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variation       6576
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variation       6656
/gene="IL11"
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variation       6669
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repeat region   6984..7169
/rpt_family="L1"
/rpt_type=dispersed
variation       7083
/gene="IL11"
/frequency="0.17"
/replace="a"
variation       7161
/gene="IL11"
/frequency="0.07"
/replace="a"
repeat region   7170..7298
/rpt_family="Alu"
/rpt_type=dispersed
variation       7249
/gene="IL11"
/frequency="0.33"
/replace="c"
repeat region   7299..7523
/rpt_family="L1"
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FIGURE 1

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repeat_region 7700..7835
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/rpt_type=dispersed
variation 7904
/frequency="0.05"
/replace="c"
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variation 8288
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/replace="a"
variation 8337
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/replace="a"
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/rpt_family="Alu"
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variation 8680
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/replace="a"
variation 8703
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/replace="t"
variation 8790
/frequency="0.01"
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FIGURE 1

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SEQ-ID NO: 73:

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FIGURE 1

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 6301 gggggccggag gggaaaggga agccctgggg tttgtacaaa aatgtgagaa acctttgtga
 6361 gacagagaac agggaaattaa atgtgtcata catatccact tgagggccat ttgtctgaga
 6421 gctggggctt gatgttggg taactggggc agggcagggtg gggggggagac ctccattcag
 6481 gtggaggtcc cgagtggccg gggcagccac tgggagatgg gtcgggtcacc cagacagctc
 6541 tgtggaggca gggcttgagc tcctggccact gcccccgcact gcataggcc gtttgggtt

FIGURE 1

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6601 ttttgagat ggagtctcg tctgtgcct aggctggagt gcagtgaggc aatctaaggt
6661 cactgcaacc tccacctccc gggttcaagc aattctcctg cctcagcctc ccgatttagct
6721 gggatcacag gtgtcacca ccatgcccaag ctaattattt atttctttt tatttttagt
6781 agagacaggg tttcaccatg ttggccaggc tggtttcgaa ctccgtaccc caggtatcc
6841 tcctgcctcg gcctccccaa gtgctggat tacaggtgtg agccaccaca cctgaccatc
6901 aggtcttcaa taaatattt atggaaggtt ccacaagtca ccctgtgatc aacagtaccc
6961 gtatggaca aagctgcaag gtcaagatgg ttcattatgg ctgtgttcac catagcaaac
7021 tggaaacaat ctagatattcc aacagtgggg gtaagcaac atgggtcatac tggtggataga
7081 acgccaccca gcccgggaa gcggggactg tcattcaggg aggctaagga gagaggctt
7141 cttggatata agaaagatata cctgacatg gccaggcatg gtggctcaacg cctgtaatcc
7201 tggcacttgc ggaggacgaa gcgggtggat cactgaagtc caagagtgg agacccgcct
7261 gcgagacatg gcaaaaacctt gtctaaaaaa agaaagaatg atgtcctgac atgaaacagc
7321 aggctacaaa accactgcat gctgtgatcc caattttgtg ttttcttca tatatatgg
7381 ttaaaacaaa aatcttaaag gggaaatacgc caaaatgtt acaatgactg tctccaggc
7441 aaaggagaga ggtgggattt tgggtgactt ttaatgtgt tgattgtctg tattttacag
7501 aatttctgcc atgactgtgt attttgcattt acacattttt aaaaataataa acactatttt
7561 tagaataaca gaatattcgc ctccctcctt ccaaaaataaa gcccctcagg gggacaaag
7621 ttgaccgctg attgagcctg tcagggtgtt gcaactaagtg tgggctttt acttacacaa
7681 tcctccttggc ctcttgcata cggccctgtt tacaggcgg gggaaactgag tctcagacaa
7741 ggagtggggc ctcttgcata caaagtccaca cagctaggaa ggggtggag tgggattctg
7801 cgccgtgttgc ggctctttcc caaagctctc ttttgcaggc ggtgttggagg aatcctcgcc
7861 acatgcacac acatgagata tggagaaaca ggttcagtaa ggatttgggtt cttaccagg
7921 gcctagagaa gggtaatgg cagagtaggg atgataattt aatgttta gttacttttcc
7981 cctttacaat aacccttgcata gacttccagg gggccctgtt cgtcaactgt ttgagtctgg
8041 gtttggaggt gcccattctg gggccggagg ttttgcatttcc ccatcatagc cctcaagact
8101 ccaggcttgc tgggcccgggtt ggctcaogcc ttttgcatttcc gcaacttggg aggtgaggc
8161 ggggtggatca ctttgcatttgc ggggttcaag gcccgttgc ccaacatgg gaaaccctgt
8221 ctctactaaa aatacaatcc agtacttcgg aaggctgggg caggagaatc gctcaaccc
8281 aggagacggg gtttgcgggtt agccggatc acatcacaaa cagccctagg cagtgccggg
8341 ccccccggcgc ggctcagacc tggccctccaca gagctgtctg ggtgtatctg cttccctccgt
8401 ggaggccaggg ttttgcatttgc ccctggggc cccgcacttgc taaggctgtt tggggctggc
8461 atggagtctc gctcttgcatttgc ctgggttgc gtcgtgtt gcaatcttcaag ctcaactgcct
8521 gggcaacaag agtggaaattt ctttgcatttgc aacaaaaaaac aaacaaacaa acaaaaaact
8581 ccaggctgttgc tccctggagg agaaggggc ccacagtccc cggagatgtt ctggaaaggagg
8641 cccctgtgttgc tccctgttgc tccctggagg ccacatggc ccccttccccc cccagacccc
8701 tgctgtccac ccttgcatttgc ccacatggc gggccatctcc tccctgttgc gggcatctcc
8761 acgtctgttgc acgtgttgcatttgc ccaggccatcc gtggatccatcc acgggtcaag gtttgcggc
8821 cggggctggg aggcttgcatttgc ccacatggc tggggccatcc aaccatgttcc catccaccac
8881 agccaccatg atctggcttgc gaaacaggag gtgccttgc cccatggc gggccatctcc
8941 gtgggtccctt gtttgcatttgc agtgcatttgc gggccatctcc aaggccatcc acctggccctt
9001 ccgtccgttgc cccatgttgc agatgttgc tggccatctcc tccatgttcc agtggccgg
9061 ggctgagagg gacaggggg aagcaaggcc cccctgttgc gggccatctcc agagggaaacg
9121 gatatttgcata gtcactgtgtt gggggccatcc cccatggc gggccatctcc
9181 aggaaggagg ggttgcatttgc cccttgcatttgc gggccatctcc aaggccatcc caagggggcc
9241 cagtttgcatttgc gatatttgcata accaaccggc tggccatctcc cggccatctcc tccatgttcc
9301 ggctgggtttgc gggccatctcc tggccatctcc gggccatctcc cggccatctcc tccatgttcc
9361 ggctgggtttgc gggccatctcc tggccatctcc gggccatctcc cggccatctcc tccatgttcc
9421 gtcactgtgttgc gggccatctcc tggccatctcc gggccatctcc cggccatctcc tccatgttcc
9481 cgtccatgttgc gggccatctcc tggccatctcc gggccatctcc cggccatctcc tccatgttcc
9541 ctttgcatttgc gggccatctcc tggccatctcc tggccatctcc cggccatctcc tccatgttcc
9601 catcaacccatg ctttgcatttgc gggccatctcc tggccatctcc cggccatctcc tccatgttcc
9661 ctttgcatttgc gggccatctcc tggccatctcc cggccatctcc tggccatctcc cggccatctcc tccatgttcc
9721 gtcactgtgttgc gggccatctcc tggccatctcc cggccatctcc tggccatctcc cggccatctcc tccatgttcc
9781 cggccatctcc tggccatctcc cggccatctcc tggccatctcc cggccatctcc tggccatctcc tccatgttcc

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FIGURE 1

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Complete native human IL-11 -SEQ ID NO:1-:

1	11	21	31	41	51
1	MNCVCRIVLV	VLSLWPDTAV	APGPPPGFPR	VSPDPRAELD	STVLLTRSLL
61	RDKEPADGDH	NLDLSLPTLAM	SAGALGALQL	PGVLTRLRAD	LMSYLRHVQW
121	TLEPELGTLQ	ARLDRLRRL	QIIMSRALP	QPPPDPAPP	LAPPSSAWGG
181	LHLTLDAVR	GLLLKTRL			IRAAHAILGG

Complete native macaque IL-11 (Macaca fascicularis) -SEQ ID NO:2-:

1	11	21	31	41	51
1	MNCVCRIVLV	VLSLWPDTAV	APGPPPGSPR	ASPDPRADLD	STVLLTRSLL
61	RDKEPADGDH	NLDLSLPTLAM	SAGALGALQL	PSVLTRLRAD	LMSYLRHVQW
121	TLEPELGTLQ	TRLDRLRRL	QIIMSRALP	QLPPDPAPP	LAPPSSWG
181	LHLTLDAVR	GLLLKTRL			IRAAHAILGG

Complete native mouse IL-11 (Mus musculus) -SEQ ID NO:3-:

1	11	21	31	41	51
1	MNCVCRIVLV	VLSLWPDRV	APGPPAGSPR	VSSDFRADLD	SAVLLTRSLL
61	RDKEPADGDH	SLDSLPTLAM	SAGTLLSSQL	PGVLTRLVD	LMSYFRHVQW
121	TLEPELGALQ	ARLERLRLRRL	QIIMSRALP	QAAPDQPVIP	LGPASSAWGS
181	LHLTLDAVR	GLLLKTRL			IRAAHAILGG

Complete native rat IL-11 (Rattus norvegicus) -SEQ ID NO:4-:

1	11	21	31	41	51
1	MNCVCRIVLV	VLSLWPDRV	APGPPAGSPR	VSSDFRADLD	SAVLLTRSLL
61	RDKEPADGDH	NLDLSLPTLAM	SAGTLLSSQL	PGVLTRLVD	LMSYFRHVQW
121	TLEPELGALQ	ARLERLRLRRL	QIIMSRALP	QAAPDQPVIP	LGPASSAWGS
181	LHLTLDAVR	GLLLKTRL			IRAAHAILGG

FIGURE 2

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Native human IL-11 deleted from the 34 first aminoacids -SEQ ID NO :5- :

PRAELD STVLLTRSLL ADTRQLAAQL RDKFPADGDH NLDSLPTLAM
SAGALGALQL PGVLTRLRAD LLSYLRHVQW LRRAGGSSLK TLEPELGTLQ
ARLDRLRLRL QLLMSRLALP QPPPDPAPP LAPPSSAWGG IRAAHAILGG
LHHTLDWAVR GLLLLKTRL

Native macaque IL-11 deleted from the 34 first aminoacids -SEQ ID NO:6- :

PRAELD STVLLTRSLL EDTRQLTIQL KDKFPADGDH NLDSLPTLAM
SAGALGALQL PSVLTRLRAD LLSYLRHVQW LRRAMGSSLK TLEPELGTLQ
TRLDRRLRL QLLMSRLALP QLPPDPAPP LAPPSSTWGG IRAAHAILGG
LHHTLDWAVR GLLLLKTRL

Native mouse IL-11 deleted from the 34 first aminoacids -SEQ ID NO:7- :

PRADLD SAVLLTRSLL ADTRQLAAQM RDKFPADGDH SLDSLPTLAM
SAGTLGSQLQ PGVLTRLRVD LMSYLRHVQW LRRAGGPSLK TLEPELGALQ
ARLERLLRL QLLMSRLALP QAAPDQPVIP LGPPASAWGS IRAAHAILGG
LHHTLDWAVR GLLLLKTRL

Native rat IL-11 deleted from the 34 first aminoacids -SEQ ID NO:8- :

PRADLD SAVLLTRSLL ADTRQLAAQM RDKFPADGDH NLDSLPTLAM
SAGTLGSQLQ PGVLTRLRVD LMSYFRHVQW LRRAAGPSLK TLEPELGALQ
ARLERLLRL QLLMSRLALP QAAPDQPAVP LGPPASAWGS IRAAHAILGG
LHHTLDWAVR GLLLLKTRL

FIGURE 3

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hIL-11 mutein deriving from 34aa-deleted native human hIL-11 -SEQ ID NO :9:-

PRAELDSTVLLTRSLLADTRQLAAQLRDKFPADGDHNLDLPTLAMSAGALGA
 LQLPGVLTRLRADLLSYLRHVQWLRRAGGSSLKTLEPELGLTLQARLDRLRL
 QLLMSRLALPQPPPDPPAPPLAPPSSAWGGIRAAHAILGGX₁LTX₂WAVRGLL
 LKTRL wherein X₁ and X₂ are chosen from the group comprising :

- Alanine (A),
- Valine (V),
- Leucine (L),
- Isoleucine (I),
- Phenylalanine (F),
- Methionine (M),
- Proline (P),
- Tryptophan (W).

hIL-11 mutein deriving from 34aa-deleted native human hIL-11 -SEQ ID NO :10:-

PRAELDSTVLLTRSLLADTRQLAAQLRDKFPADGDHNLDLPTLAMSAGALGA
 LQLPGVLTRLRADLLSYLRHVQWLRRAGGSSLKTLEPELGLTLQARLDRLRL
 QLLMSRLALPQPPPDPPAPPLAPPSSAWGGIRAAHAILGGVLTLWAVRGLL
 LKTRL

hIL-11 mutein deriving from 34aa-deleted native human hIL-11 -SEQ ID NO :11:-

PRAELDSTVLLTRSLLADTRQLAAQLRDKFPADGDHNLDLPTLAMSAGALGA
 LQLPGVLTRLRADLLSYLRHVQWLRRAGGSSLKTLEPELGLTLQARLDRLRL
 QLLMSRLALPQPPPDPPAPPLAPPSSAWGGIRAAHAILGGALTLYWAVRGLL
 LKTRL

hIL-11 mutein deriving from 34aa-deleted native human hIL-11 -SEQ ID NO :12:-

PRAELDSTVLLTRSLLADTRQLAAQLRDKFPADGDHNLDLPTLAMSAGALGA
 LQLPGVLTRLRADLLSYLRHVQWLRRAGGSSLKTLEPELGLTLQARLDRLRL
 QLLMSRLALPQPPPDPPAPPLAPPSSAWGGIRAAHAILGGVLTLWAVRGLL
 LKTRL

hIL-11 mutein deriving from 34aa-deleted native human hIL-11 -SEQ ID NO :13:-

PRAELDSTVLLTRSLLADTRQLAAQLRDKFPADGDHNLDLPTLAMSAGALGA
 LQLPGVLTRLRADLLSYLRHVQWLRRAGGSSLKTLEPELGLTLQARLDRLRL
 QLLMSRLALPQPPPDPPAPPLAPPSSAWGGIRAAHAILGGALTLWAVRGLL
 LKTRL

FIGURE 4

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hIL-11 mutein deriving from 21aa-deleted native human hIL-11 -SEQ ID NO :14-:

PGPPPGPPRVSPDPRAELDSTVLLTRSLLADTRQLAAQLRDKFPADGDHNLDL
 PTLAMSAGALGALQLPGVLTRLRADLLSYLRHVQWLRRAGGSSLKTLEPELGT
 LQARLDRLRLQQLMSRLALPQPPPDPPAPPLAPPSSAWGGIRAAHAILGGLX₁
LTX₂WAVRGLLLLKTRL

wherein X₁ and X₂ are chosen from the group comprising :

- Alanine (A),
- Valine (V),
- Leucine (L),
- Isoleucine (I),
- Phenylalanine (F),
- Methionine (M),
- Proline (P),
- Tryptophan (W).

hIL-11 mutein deriving from 21aa-deleted native human hIL-11 -SEQ ID NO :15-:

PGPPPGPPRVSPDPRAELDSTVLLTRSLLADTRQLAAQLRDKFPADGDHNLDL
 PTLAMSAGALGALQLPGVLTRLRADLLSYLRHVQWLRRAGGSSLKTLEPELGT
 LQARLDRLRLQQLMSRLALPQPPPDPPAPPLAPPSSAWGGIRAAHAILGGLVL
TLAWAVRGLLLLKTRL

hIL-11 mutein deriving from 21aa-deleted native human hIL-11 -SEQ ID NO :16-:

PGPPPGPPRVSPDPRAELDSTVLLTRSLLADTRQLAAQLRDKFPADGDHNLDL
 PTLAMSAGALGALQLPGVLTRLRADLLSYLRHVQWLRRAGGSSLKTLEPELGT
 LQARLDRLRLQQLMSRLALPQPPPDPPAPPLAPPSSAWGGIRAAHAILGGLAL
TLYWAVRGLLLLKTRL

hIL-11 mutein deriving from 21aa-deleted native human hIL-11 -SEQ ID NO :17-:

PGPPPGPPRVSPDPRAELDSTVLLTRSLLADTRQLAAQLRDKFPADGDHNLDL
 PTLAMSAGALGALQLPGVLTRLRADLLSYLRHVQWLRRAGGSSLKTLEPELGT
 LQARLDRLRLQQLMSRLALPQPPPDPPAPPLAPPSSAWGGIRAAHAILGGLVL
TLVWAVRGLLLLKTRL

hIL-11 mutein deriving from 21aa-deleted native human hIL-11 -SEQ ID NO :18-:

PGPPPGPPRVSPDPRAELDSTVLLTRSLLADTRQLAAQLRDKFPADGDHNLDL
 PTLAMSAGALGALQLPGVLTRLRADLLSYLRHVQWLRRAGGSSLKTLEPELGT
 LQARLDRLRLQQLMSRLALPQPPPDPPAPPLAPPSSAWGGIRAAHAILGGLAL
TLAWAVRGLLLLKTRL

FIGURE 5

hIL-11 mutein deriving from complete native human hIL-11 -SEQ ID NO :19:-

MNCVCR_LVV_VLSLWPDTAVAPG_{PPP}G_{PPR}VSPD_PR_AE_LD_ST_VL_TR_SL_LA_DTR
 QLAAQLRD_KF_AD_GD_HN_LD_SL_PT_LA_MS_AG_AL_GA_LQ_LP_GV_LT_RL_RA_DL_LS_YL_RH
 VQWLRRAGGSSLK_TL_EP_EL_GT_LQ_AR_LD_R_LR_RL_QL_LM_SR_LA_LP_QP_PP_DP_PA_PPL
 APPSSAWGGIRAAHAILGG_LX₁L_TLX₂WA_VR_GL_LL_KT_RL

wherein X₁ and X₂ are chosen from the group comprising :

- Alanine (A),
- Valine (V),
- Leucine (L),
- Isoleucine (I),
- Phenylalanine (F),
- Methionine (M),
- Proline (P),
- Tryptophan (W).

hIL-11 mutein deriving from complete native human hIL-11 -SEQ ID NO :20:-

MNCVCR_LVV_VLSLWPDTAVAPG_{PPP}G_{PPR}VSPD_PR_AE_LD_ST_VL_TR_SL_LA_DTR
 QLAAQLRD_KF_AD_GD_HN_LD_SL_PT_LA_MS_AG_AL_GA_LQ_LP_GV_LT_RL_RA_DL_LS_YL_RH
 VQWLRRAGGSSLK_TL_EP_EL_GT_LQ_AR_LD_R_LR_RL_QL_LM_SR_LA_LP_QP_PP_DP_PA_PPL
 APPSSAWGGIRAAHAILGG_LV_LT_AWA_VR_GL_LL_KT_RL

hIL-11 mutein deriving from complete native human hIL-11 -SEQ ID NO :21:-

MNCVCR_LVV_VLSLWPDTAVAPG_{PPP}G_{PPR}VSPD_PR_AE_LD_ST_VL_TR_SL_LA_DTR
 QLAAQLRD_KF_AD_GD_HN_LD_SL_PT_LA_MS_AG_AL_GA_LQ_LP_GV_LT_RL_RA_DL_LS_YL_RH
 VQWLRRAGGSSLK_TL_EP_EL_GT_LQ_AR_LD_R_LR_RL_QL_LM_SR_LA_LP_QP_PP_DP_PA_PPL
 APPSSAWGGIRAAHAILGG_LA_LT_LV_VWA_VR_GL_LL_KT_RL

hIL-11 mutein deriving from complete native human hIL-11 -SEQ ID NO :22:-

MNCVCR_LVV_VLSLWPDTAVAPG_{PPP}G_{PPR}VSPD_PR_AE_LD_ST_VL_TR_SL_LA_DTR
 QLAAQLRD_KF_AD_GD_HN_LD_SL_PT_LA_MS_AG_AL_GA_LQ_LP_GV_LT_RL_RA_DL_LS_YL_RH
 VQWLRRAGGSSLK_TL_EP_EL_GT_LQ_AR_LD_R_LR_RL_QL_LM_SR_LA_LP_QP_PP_DP_PA_PPL
 APPSSAWGGIRAAHAILGG_LV_LT_LV_VWA_VR_GL_LL_KT_RL

hIL-11 mutein deriving from complete native human hIL-11 -SEQ ID NO :23:-

MNCVCR_LVV_VLSLWPDTAVAPG_{PPP}G_{PPR}VSPD_PR_AE_LD_ST_VL_TR_SL_LA_DTR
 QLAAQLRD_KF_AD_GD_HN_LD_SL_PT_LA_MS_AG_AL_GA_LQ_LP_GV_LT_RL_RA_DL_LS_YL_RH
 VQWLRRAGGSSLK_TL_EP_EL_GT_LQ_AR_LD_R_LR_RL_QL_LM_SR_LA_LP_QP_PP_DP_PA_PPL
 APPSSAWGGIRAAHAILGG_LA_LT_LA_AWA_VR_GL_LL_KT_RL

IL-11 mutein deriving from 34aa-deleted native macaque IL-11 -SEQ ID NO:24- :

PRAELD STVLLTRSLL EDTRQLTIQL KDKFPADGDH NLDSLPTLAM
 SAGALGALQL PSVLTRLRAD LLSYLRHVQW LRRAMGSSLK TLEPELGLTQ
 TRLDRLRLRRRL QLLMSRLALP QLPPDPPAPP LAPPSSTWGG
 IRAAHAILGG LX₁LTX₂WAVR GLLLLKTRL

wherein X₁ and X₂ are chosen from the group comprising :

- Alanine (A),
- Valine (V),
- Leucine (L),
- Isoleucine (I),
- Phenylalanine (F),
- Methionine (M),
- Proline (P),
- Tryptophan (W).

IL-11 mutein deriving from 34aa-deleted native macaque IL-11 -SEQ ID NO:25- :

PRAELD STVLLTRSLL EDTRQLTIQL KDKFPADGDH NLDSLPTLAM
 SAGALGALQL PSVLTRLRAD LLSYLRHVQW LRRAMGSSLK TLEPELGLTQ
 TRLDRLRLRRRL QLLMSRLALP QLPPDPPAPP LAPPSSTWGG
 IRAAHAILGG LYLTLAWAVR GLLLLKTRL

IL-11 mutein deriving from 34aa-deleted native macaque IL-11 -SEQ ID NO:26- :

PRAELD STVLLTRSLL EDTRQLTIQL KDKFPADGDH NLDSLPTLAM
 SAGALGALQL PSVLTRLRAD LLSYLRHVQW LRRAMGSSLK TLEPELGLTQ
 TRLDRLRLRRRL QLLMSRLALP QLPPDPPAPP LAPPSSTWGG
 IRAAHAILGG LALTLYWAVR GLLLLKTRL

IL-11 mutein deriving from 34aa-deleted native macaque IL-11 -SEQ ID NO:27- :

PRAELD STVLLTRSLL EDTRQLTIQL KDKFPADGDH NLDSLPTLAM
 SAGALGALQL PSVLTRLRAD LLSYLRHVQW LRRAMGSSLK TLEPELGLTQ
 TRLDRLRLRRRL QLLMSRLALP QLPPDPPAPP LAPPSSTWGG
 IRAAHAILGG LYLTLYWAVR GLLLLKTRL

IL-11 mutein deriving from 34aa-deleted native macaque IL-11 -SEQ ID NO:28- :

PRAELD STVLLTRSLL EDTRQLTIQL KDKFPADGDH NLDSLPTLAM
 SAGALGALQL PSVLTRLRAD LLSYLRHVQW LRRAMGSSLK TLEPELGLTQ
 TRLDRLRLRRRL QLLMSRLALP QLPPDPPAPP LAPPSSTWGG
 IRAAHAILGG LALTLAWAVR GLLLLKTRL

FIGURE 7

IL-11 mutein deriving from 21aa-deleted native macaque IL-11 -SEQ ID NO:29- :

PGPPPGSPR ASPDPRAELD STVLLTRSLL EDTRQLTIQL KDKFPADGDH
 NLDSLPTLAM SAGALGALQL PSVLTRLRAD LLSYLRHVQW LRRAMGSSLK
 TLEPELGTQ TRLDRLRLRL QLLMSRLALP QLPPDPPAPP
 LAPPSSTWGG IRAAHAILGG LX₁LTX₂WAVR GLLLLKTRL
 wherein X₁ and X₂ are chosen from the group comprising :

- Alanine (A),
- Valine (V),
- Leucine (L),
- Isoleucine (I),
- Phenylalanine (F),
- Methionine (M),
- Proline (P),
- Tryptophan (W).

IL-11 mutein deriving from 21aa-deleted native macaque IL-11 -SEQ ID NO:30- :

PGPPPGSPR ASPDPRAELD STVLLTRSLL EDTRQLTIQL KDKFPADGDH
 NLDSLPTLAM SAGALGALQL PSVLTRLRAD LLSYLRHVQW LRRAMGSSLK
 TLEPELGTQ TRLDRLRLRL QLLMSRLALP QLPPDPPAPP
 LAPPSSTWGG IRAAHAILGG LYLTLWAVR GLLLLKTRL

IL-11 mutein deriving from 21aa-deleted native macaque IL-11 -SEQ ID NO:31- :

PGPPPGSPR ASPDPRAELD STVLLTRSLL EDTRQLTIQL KDKFPADGDH
 NLDSLPTLAM SAGALGALQL PSVLTRLRAD LLSYLRHVQW LRRAMGSSLK
 TLEPELGTQ TRLDRLRLRL QLLMSRLALP QLPPDPPAPP
 LAPPSSTWGG IRAAHAILGG LALTLYWAVR GLLLLKTRL

IL-11 mutein deriving from 21aa-deleted native macaque IL-11 -SEQ ID NO:32- :

PGPPPGSPR ASPDPRAELD STVLLTRSLL EDTRQLTIQL KDKFPADGDH
 NLDSLPTLAM SAGALGALQL PSVLTRLRAD LLSYLRHVQW LRRAMGSSLK
 TLEPELGTQ TRLDRLRLRL QLLMSRLALP QLPPDPPAPP
 LAPPSSTWGG IRAAHAILGG LYLTLYWAVR GLLLLKTRL

IL-11 mutein deriving from 21aa-deleted native macaque IL-11 -SEQ ID NO:33- :

PGPPPGSPR ASPDPRAELD STVLLTRSLL EDTRQLTIQL KDKFPADGDH
 NLDSLPTLAM SAGALGALQL PSVLTRLRAD LLSYLRHVQW LRRAMGSSLK
 TLEPELGTQ TRLDRLRLRL QLLMSRLALP QLPPDPPAPP
 LAPPSSTWGG IRAAHAILGG LALTLYWAVR GLLLLKTRL

FIGURE 8

IL-11 mutein deriving from complete native macaque IL-11 -SEQ ID NO:34- :

MNCVCR_LVLV VLSLWPDTAV APGPPPGSPR ASPDPRAELD STVLLTRSLL
 EDTRQLTIQL KDKFPADGDH NLDSLPTLAM SAGALGALQL PSVLTRLRAD
 LLSYLRHVQW LRRAMGSSLK TLEPELGLQ TRLDRLRRRL QLLMSRLALP
 QLPPDPPAPP LAPPSSTWGG IRAAHAILGG LX₁LTX₂WAVR
 GLLLLKTRL

wherein X₁ and X₂ are chosen from the group comprising :

- Alanine (A),
- Valine (V),
- Leucine (L),
- Isoleucine (I),
- Phenylalanine (F),
- Methionine (M),
- Proline (P),
- Tryptophan (W).

IL-11 mutein deriving from complete native macaque IL-11 -SEQ ID NO:35- :

MNCVCR_LVLV VLSLWPDTAV APGPPPGSPR ASPDPRAELD STVLLTRSLL
 EDTRQLTIQL KDKFPADGDH NLDSLPTLAM SAGALGALQL PSVLTRLRAD
 LLSYLRHVQW LRRAMGSSLK TLEPELGLQ TRLDRLRRRL QLLMSRLALP
 QLPPDPPAPP LAPPSSTWGG IRAAHAILGG LVLTLWAVR GLLLLKTRL

IL-11 mutein deriving from complete native macaque IL-11 -SEQ ID NO:36- :

MNCVCR_LVLV VLSLWPDTAV APGPPPGSPR ASPDPRAELD STVLLTRSLL
 EDTRQLTIQL KDKFPADGDH NLDSLPTLAM SAGALGALQL PSVLTRLRAD
 LLSYLRHVQW LRRAMGSSLK TLEPELGLQ TRLDRLRRRL QLLMSRLALP
 QLPPDPPAPP LAPPSSTWGG IRAAHAILGG LALTLYWAVR GLLLLKTRL

IL-11 mutein deriving from complete native macaque IL-11 -SEQ ID NO:37- :

MNCVCR_LVLV VLSLWPDTAV APGPPPGSPR ASPDPRAELD STVLLTRSLL
 EDTRQLTIQL KDKFPADGDH NLDSLPTLAM SAGALGALQL PSVLTRLRAD
 LLSYLRHVQW LRRAMGSSLK TLEPELGLQ TRLDRLRRRL QLLMSRLALP
 QLPPDPPAPP LAPPSSTWGG IRAAHAILGG LYLTLYWAVR GLLLLKTRL

IL-11 mutein deriving from complete native macaque IL-11 -SEQ ID NO:38- :

MNCVCR_LVLV VLSLWPDTAV APGPPPGSPR ASPDPRAELD STVLLTRSLL
 EDTRQLTIQL KDKFPADGDH NLDSLPTLAM SAGALGALQL PSVLTRLRAD
 LLSYLRHVQW LRRAMGSSLK TLEPELGLQ TRLDRLRRRL QLLMSRLALP
 QLPPDPPAPP LAPPSSTWGG IRAAHAILGG LALTLWAVR GLLLLKTRL

FIGURE 9

IL-11 mutein deriving from 34aa-deleted native mouse IL-11 -SEQ ID NO:39- :

PRADLD SAVLLTRSLL ADTRQLAAQM RDKFPADGDH SLDSLPTLAM
 SAGTLGSQLQ PGVLTRLRVD LMSYLRHVQW LRRAGGPSLK TLEPELGALQ
 ARLERLLRRL QLLMSRLALP QAAPDQPVIP LGPPASAWGS IRAAHAILGG
LX₁LTX₂WAVR GLLLLKTRL

wherein X₁ and X₂ are chosen from the group comprising :

- Alanine (A),
- Valine (V),
- Leucine (L),
- Isoleucine (I),
- Phenylalanine (F),
- Methionine (M),
- Proline (P),
- Tryptophan (W).

IL-11 mutein deriving from 34aa-deleted native mouse IL-11 -SEQ ID NO:40- :

PRADLD SAVLLTRSLL ADTRQLAAQM RDKFPADGDH SLDSLPTLAM
 SAGTLGSQLQ PGVLTRLRVD LMSYLRHVQW LRRAGGPSLK TLEPELGALQ
 ARLERLLRRL QLLMSRLALP QAAPDQPVIP LGPPASAWGS IRAAHAILGG
LVTLAWAVR GLLLLKTRL

IL-11 mutein deriving from 34aa-deleted native mouse IL-11 -SEQ ID NO:41- :

PRADLD SAVLLTRSLL ADTRQLAAQM RDKFPADGDH SLDSLPTLAM
 SAGTLGSQLQ PGVLTRLRVD LMSYLRHVQW LRRAGGPSLK TLEPELGALQ
 ARLERLLRRL QLLMSRLALP QAAPDQPVIP LGPPASAWGS IRAAHAILGG
LALTLYWAVR GLLLLKTRL

IL-11 mutein deriving from 34aa-deleted native mouse IL-11 -SEQ ID NO:42- :

PRADLD SAVLLTRSLL ADTRQLAAQM RDKFPADGDH SLDSLPTLAM
 SAGTLGSQLQ PGVLTRLRVD LMSYLRHVQW LRRAGGPSLK TLEPELGALQ
 ARLERLLRRL QLLMSRLALP QAAPDQPVIP LGPPASAWGS IRAAHAILGG
LVTLYWAVR GLLLLKTRL

IL-11 mutein deriving from 34aa-deleted native mouse IL-11 -SEQ ID NO:43- :

PRADLD SAVLLTRSLL ADTRQLAAQM RDKFPADGDH SLDSLPTLAM
 SAGTLGSQLQ PGVLTRLRVD LMSYLRHVQW LRRAGGPSLK TLEPELGALQ
 ARLERLLRRL QLLMSRLALP QAAPDQPVIP LGPPASAWGS IRAAHAILGG
LALTLWAVR GLLLLKTRL

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IL-11 mutein deriving from 21aa-deleted native mouse IL-11 -SEQ ID NO:44- :

PGPPAGSPR VSSDPRADLD SAVLLTRSLL ADTRQLAAQM RDKFPADGDH
 SLDSLPTLAM SAGTLGSQLQ PGVLTRLRVD LMSYLRHVQW LRRAGGPSLK
 TLEPELGALQ ARLERLLRRL QLLMSRLALP QAAPDQPVIP LGPPASAWGS
 IRAAHAILGG LX₁LTX₂WAVR GLLLLKTRL

wherein X₁ and X₂ are chosen from the group comprising :

- Alanine (A),
- Valine (V),
- Leucine (L),
- Isoleucine (I),
- Phenylalanine (F),
- Methionine (M),
- Proline (P),
- Tryptophan (W).

IL-11 mutein deriving from 21aa-deleted native mouse IL-11 -SEQ ID NO:45- :

PGPPAGSPR VSSDPRADLD SAVLLTRSLL ADTRQLAAQM RDKFPADGDH
 SLDSLPTLAM SAGTLGSQLQ PGVLTRLRVD LMSYLRHVQW LRRAGGPSLK
 TLEPELGALQ ARLERLLRRL QLLMSRLALP QAAPDQPVIP LGPPASAWGS
 IRAAHAILGG LVLTAWAVR GLLLLKTRL

IL-11 mutein deriving from 21aa-deleted native mouse IL-11 -SEQ ID NO:46- :

PGPPAGSPR VSSDPRADLD SAVLLTRSLL ADTRQLAAQM RDKFPADGDH
 SLDSLPTLAM SAGTLGSQLQ PGVLTRLRVD LMSYLRHVQW LRRAGGPSLK
 TLEPELGALQ ARLERLLRRL QLLMSRLALP QAAPDQPVIP LGPPASAWGS
 IRAAHAILGG LALTLVWAVR GLLLLKTRL

IL-11 mutein deriving from 21aa-deleted native mouse IL-11 -SEQ ID NO:47- :

PGPPAGSPR VSSDPRADLD SAVLLTRSLL ADTRQLAAQM RDKFPADGDH
 SLDSLPTLAM SAGTLGSQLQ PGVLTRLRVD LMSYLRHVQW LRRAGGPSLK
 TLEPELGALQ ARLERLLRRL QLLMSRLALP QAAPDQPVIP LGPPASAWGS
 IRAAHAILGG LVLTLVWAVR GLLLLKTRL

IL-11 mutein deriving from 21aa-deleted native mouse IL-11 -SEQ ID NO:48- :

PGPPAGSPR VSSDPRADLD SAVLLTRSLL ADTRQLAAQM RDKFPADGDH
 SLDSLPTLAM SAGTLGSQLQ PGVLTRLRVD LMSYLRHVQW LRRAGGPSLK
 TLEPELGALQ ARLERLLRRL QLLMSRLALP QAAPDQPVIP LGPPASAWGS
 IRAAHAILGG LALTLAWAVR GLLLLKTRL

FIGURE 11

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IL-11 mutein deriving from complete native mouse IL-11 -SEQ ID NO:49- :

MNCVCR₁LVL VLSLWPDRV₂ APGPPAGSPR VSSDPRADLD SAVLLTRSLL
 ADTRQLAAQM RD₁KFPADGDH SLDSLPTLAM SAGTLGSQLQ PGVLTRLRVD
 LMSYLRHVQW LRRAGGPSLK TLEPELGALQ ARLERLLRRL QLLMSRLALP
 QAAPDQPVIP LGPPASA₁WGS IRAAHAILGG LX₁LTX₂WAVR
 GLLLKTRL

wherein X₁ and X₂ are chosen from the group comprising :

- Alanine (A),
- Valine (V),
- Leucine (L),
- Isoleucine (I),
- Phenylalanine (F),
- Methionine (M),
- Proline (P),
- Tryptophan (W).

IL-11 mutein deriving from complete native mouse IL-11 -SEQ ID NO:50- :

MNCVCR₁LVL VLSLWPDRV₂ APGPPAGSPR VSSDPRADLD SAVLLTRSLL
 ADTRQLAAQM RD₁KFPADGDH SLDSLPTLAM SAGTLGSQLQ PGVLTRLRVD
 LMSYLRHVQW LRRAGGPSLK TLEPELGALQ ARLERLLRRL QLLMSRLALP
 QAAPDQPVIP LGPPASA₁WGS IRAAHAILGG LVLTL₂WAVR GLLLKTRL

IL-11 mutein deriving from complete native mouse IL-11 -SEQ ID NO:51- :

MNCVCR₁LVL VLSLWPDRV₂ APGPPAGSPR VSSDPRADLD SAVLLTRSLL
 ADTRQLAAQM RD₁KFPADGDH SLDSLPTLAM SAGTLGSQLQ PGVLTRLRVD
 LMSYLRHVQW LRRAGGPSLK TLEPELGALQ ARLERLLRRL QLLMSRLALP
 QAAPDQPVIP LGPPASA₁WGS IRAAHAILGG LALTLYWAVR GLLLKTRL

IL-11 mutein deriving from complete native mouse IL-11 -SEQ ID NO:52- :

MNCVCR₁LVL VLSLWPDRV₂ APGPPAGSPR VSSDPRADLD SAVLLTRSLL
 ADTRQLAAQM RD₁KFPADGDH SLDSLPTLAM SAGTLGSQLQ PGVLTRLRVD
 LMSYLRHVQW LRRAGGPSLK TLEPELGALQ ARLERLLRRL QLLMSRLALP
 QAAPDQPVIP LGPPASA₁WGS IRAAHAILGG LVLTL₂WAVR GLLLKTRL

IL-11 mutein deriving from complete native mouse IL-11 -SEQ ID NO:53- :

MNCVCR₁LVL VLSLWPDRV₂ APGPPAGSPR VSSDPRADLD SAVLLTRSLL
 ADTRQLAAQM RD₁KFPADGDH SLDSLPTLAM SAGTLGSQLQ PGVLTRLRVD
 LMSYLRHVQW LRRAGGPSLK TLEPELGALQ ARLERLLRRL QLLMSRLALP
 QAAPDQPVIP LGPPASA₁WGS IRAAHAILGG LALT₂WAVR GLLLKTRL

FIGURE 12

IL-11 mutein deriving from 34aa-deleted native rat IL-11 -SEQ ID NO:54- :

PRADLD SAVLLTRSLL ADTRQLAAQM RDKFPADGDH NLDSLPTLAM
 SAGTLGSQLQ PGVLTRLRVD LMSYFRHVQW LRRAAGPSLK TLEPELGALQ
 ARLERLLRRL QLLMSRLALP QAAPDQPAVP LGPPASAWGS IRAAHAILGG
LX₁LTX₂WAVR GLLLLKTRL

wherein X₁ and X₂ are chosen from the group comprising :

- Alanine (A),
- Valine (V),
- Leucine (L),
- Isoleucine (I),
- Phenylalanine (F),
- Methionine (M),
- Proline (P),
- Tryptophan (W).

IL-11 mutein deriving from 34aa-deleted native rat IL-11 -SEQ ID NO:55- :

PRADLD SAVLLTRSLL ADTRQLAAQM RDKFPADGDH NLDSLPTLAM
 SAGTLGSQLQ PGVLTRLRVD LMSYFRHVQW LRRAAGPSLK TLEPELGALQ
 ARLERLLRRL QLLMSRLALP QAAPDQPAVP LGPPASAWGS IRAAHAILGG
LVLTLAWAVR GLLLLKTRL

IL-11 mutein deriving from 34aa-deleted native rat IL-11 -SEQ ID NO:56- :

PRADLD SAVLLTRSLL ADTRQLAAQM RDKFPADGDH NLDSLPTLAM
 SAGTLGSQLQ PGVLTRLRVD LMSYFRHVQW LRRAAGPSLK TLEPELGALQ
 ARLERLLRRL QLLMSRLALP QAAPDQPAVP LGPPASAWGS IRAAHAILGG
LALTLYWAVR GLLLLKTRL

IL-11 mutein deriving from 34aa-deleted native rat IL-11 -SEQ ID NO:57- :

PRADLD SAVLLTRSLL ADTRQLAAQM RDKFPADGDH NLDSLPTLAM
 SAGTLGSQLQ PGVLTRLRVD LMSYFRHVQW LRRAAGPSLK TLEPELGALQ
 ARLERLLRRL QLLMSRLALP QAAPDQPAVP LGPPASAWGS IRAAHAILGG
LVLTLVWAVR GLLLLKTRL

IL-11 mutein deriving from 34aa-deleted native rat IL-11 -SEQ ID NO:58- :

PRADLD SAVLLTRSLL ADTRQLAAQM RDKFPADGDH NLDSLPTLAM
 SAGTLGSQLQ PGVLTRLRVD LMSYFRHVQW LRRAAGPSLK TLEPELGALQ
 ARLERLLRRL QLLMSRLALP QAAPDQPAVP LGPPASAWGS IRAAHAILGG
LALTLAWAVR GLLLLKTRL

IL-11 mutein deriving from 21aa-deleted native rat IL-11 -SEQ ID NO:59- :

PGPPAGSPR VSSDPRADLD SAVLLTRSLL ADTRQLAAQM RDKFPADGDH
NLDSLPTLAM SAGTLGSQLQ PGVLTRLRVD LMSYFRHVQW LRRAAGPSLK
TLEPELGALQ ARLERLLRRRL QLLMSRLALP QAAPDQPAVP LGPPASAWGS
IRAAHAILGG LX₁LTX₂WAVR GLLLLKTRL

wherein X₁ and X₂ are chosen from the group comprising :

- Alanine (A),
- Valine (V),
- Leucine (L),
- Isoleucine (I),
- Phenylalanine (F),
- Methionine (M),
- Proline (P),
- Tryptophan (W).

IL-11 mutein deriving from 21aa-deleted native rat IL-11 -SEQ ID NO:60- :

PGPPAGSPR VSSDPRADLD SAVLLTRSLL ADTRQLAAQM RDKFPADGDH
NLDSLPTLAM SAGTLGSQLQ PGVLTRLRVD LMSYFRHVQW LRRAAGPSLK
TLEPELGALQ ARLERLLRRRL QLLMSRLALP QAAPDQPAVP LGPPASAWGS
IRAAHAILGG LYLTLAWAVR GLLLLKTRL

IL-11 mutein deriving from 21aa-deleted native rat IL-11 -SEQ ID NO:61- :

PGPPAGSPR VSSDPRADLD SAVLLTRSLL ADTRQLAAQM RDKFPADGDH
NLDSLPTLAM SAGTLGSQLQ PGVLTRLRVD LMSYFRHVQW LRRAAGPSLK
TLEPELGALQ ARLERLLRRRL QLLMSRLALP QAAPDQPAVP LGPPASAWGS
IRAAHAILGG LALTLYWAVR GLLLLKTRL

IL-11 mutein deriving from 21aa-deleted native rat IL-11 -SEQ ID NO:62- :

PGPPAGSPR VSSDPRADLD SAVLLTRSLL ADTRQLAAQM RDKFPADGDH
NLDSLPTLAM SAGTLGSQLQ PGVLTRLRVD LMSYFRHVQW LRRAAGPSLK
TLEPELGALQ ARLERLLRRRL QLLMSRLALP QAAPDQPAVP LGPPASAWGS
IRAAHAILGG LYLTLYWAVR GLLLLKTRL

IL-11 mutein deriving from 21aa-deleted native rat IL-11 -SEQ ID NO:63- :

PGPPAGSPR VSSDPRADLD SAVLLTRSLL ADTRQLAAQM RDKFPADGDH
NLDSLPTLAM SAGTLGSQLQ PGVLTRLRVD LMSYFRHVQW LRRAAGPSLK
TLEPELGALQ ARLERLLRRRL QLLMSRLALP QAAPDQPAVP LGPPASAWGS
IRAAHAILGG LALTLAWAVR GLLLLKTRL

IL-11 mutein deriving from complete native rat IL-11 -SEQ ID NO:64- :

MNCVCR₁LV₂ VSLWPDRVV APGPPAGSPR VSSDPRADLD SAVLLTRSLL
 ADTRQLAAQM RDKFPADGDH NLD₃LPTLAM SAGTLGSQLQ PGVLTRLRVD
 LMSYFRHVQW LRRAAGPSLK TLEPELGALQ ARLERLLRRL QLLMSRLALP
 QAAPDQPAVP LGPPASA₅WGS IRAAHAILGG X₁X₂WAVR GLLLKTRL
 wherein X₁ and X₂ are chosen from the group comprising :

- Alanine (A),
- Valine (V),
- Leucine (L),
- Isoleucine (I),
- Phenylalanine (F),
- Methionine (M),
- Proline (P),
- Tryptophan (W).

IL-11 mutein deriving from complete native rat IL-11 -SEQ ID NO:65- :

MNCVCR₁LV₂ VSLWPDRVV APGPPAGSPR VSSDPRADLD SAVLLTRSLL
 ADTRQLAAQM RDKFPADGDH NLD₃LPTLAM SAGTLGSQLQ PGVLTRLRVD
 LMSYFRHVQW LRRAAGPSLK TLEPELGALQ ARLERLLRRL QLLMSRLALP
 QAAPDQPAVP LGPPASA₅WGS IRAAHAILGG L₁L₂WAVR GLLLKTRL

IL-11 mutein deriving from complete native rat IL-11 -SEQ ID NO:66- :

MNCVCR₁LV₂ VSLWPDRVV APGPPAGSPR VSSDPRADLD SAVLLTRSLL
 ADTRQLAAQM RDKFPADGDH NLD₃LPTLAM SAGTLGSQLQ PGVLTRLRVD
 LMSYFRHVQW LRRAAGPSLK TLEPELGALQ ARLERLLRRL QLLMSRLALP
 QAAPDQPAVP LGPPASA₅WGS IRAAHAILGG L₁L₂WAVR GLLLKTRL

IL-11 mutein deriving from complete native rat IL-11 -SEQ ID NO:67- :

MNCVCR₁LV₂ VSLWPDRVV APGPPAGSPR VSSDPRADLD SAVLLTRSLL
 ADTRQLAAQM RDKFPADGDH NLD₃LPTLAM SAGTLGSQLQ PGVLTRLRVD
 LMSYFRHVQW LRRAAGPSLK TLEPELGALQ ARLERLLRRL QLLMSRLALP
 QAAPDQPAVP LGPPASA₅WGS IRAAHAILGG L₁L₂WAVR GLLLKTRL

IL-11 mutein deriving from complete native rat IL-11 -SEQ ID NO:68- :

MNCVCR₁LV₂ VSLWPDRVV APGPPAGSPR VSSDPRADLD SAVLLTRSLL
 ADTRQLAAQM RDKFPADGDH NLD₃LPTLAM SAGTLGSQLQ PGVLTRLRVD
 LMSYFRHVQW LRRAAGPSLK TLEPELGALQ ARLERLLRRL QLLMSRLALP
 QAAPDQPAVP LGPPASA₅WGS IRAAHAILGG L₁L₂WAVR GLLLKTRL

FIGURE 15

Joined CDS for human complete native IL-11 -SEQ ID NO:69-:

atg aac tgt gtt tgc cgc ctg gtc gtc gtg ctg agc ctg tgg cca gat aca gct gtc gcc cct ggg cca cca
 cct ggc ccc cct ega gtt tcc cca gac cct cgg gcc gag ctg gac agc acc gtg ctc ctg acc cgc tct ctc
 ctg gcg gac acg cgg cag ctg gct gca cag ctg agg gac aaa ttc cca gct gac ggg gac cac aac ctg gat
 tcc ctg ccc acc ctg gcc atg agt gcg ggg gca ctg gga gct cta cag ctc cca ggt gtg ctg aca agg
 ctg cga gcg gac cta ctg tcc tac ctg cgg cac gtg cag tgg ctg cgc cgg gca ggt ggc tct tcc ctg aag
 acc ctg gag ccc gag ctg ggc acc ctg cag gcc cga ctg gac cgg ctg ctg cgc cgg ctg cag ctc ctg atg
 tcc cgc ctg gcc ctg ccc cag cca ccc ccg gac ccg ccg gcg ccc ccg ctg gcg ccc ccc tcc tca gcc tgg
 ggg ggc atc agg gcc gcc cac gcc atc ctg ggg ggg ctg cac ctg aca ctt gac tgg gcc gtg agg gga
 ctg ctg ctg aag act cgg ctg tga

Joined CDS for the IL-11 mutein which derives from the 34aa-deleted human IL-11 – SEQ ID NO:70-:

cct cgg gcc gag ctg gac agc acc gtg ctc ctg acc cgc tct ctc ctg gcg gac acg cgg cag ctg gct gca
 cag ctg agg gac aaa ttc cca gct gac ggg gac cac aac ctg gat tcc ctg ccc acc ctg gcc atg agt gcg
 ggg gca ctg gga gct cta cag ctc cca ggt gtg ctg aca agg ctg cga gcg gac cta ctg tcc tac ctg cgg
 cac gtg cag tgg ctg cgc cgg gca ggt ggc tct tcc ctg aag acc ctg gag ccc gag ctg ggc acc ctg cag
 gcc cga ctg gac cgg ctg cgc cgg ctg cag ctc ctg atg tcc cgc ctg gcc ctg ccc cag cca ccc ccg
 gac ccg ccg ccc ccg ctg gcg ccc ccc tcc tca gcc tgg ggg ggc atc agg gcc cac gcc atc
 ctg ggg ggg ctg n₁n₂n₃ ctg aca ctt n₄n₅n₆ tgg gcc gtg agg gga ctg ctg ctg aag act cgg ctg
 tga

wherein the codon n₁n₂n₃ and the codon n₄n₅n₆ are both chosen among the group comprising the nucleotide codons which codes for a hydrophobic aminoacid, namely for Alanine (A), Valine (V), Leucine (L), Isoleucine (I), Phenylalanine (F), Methionine (M), Proline (P), Tryptophan (W).

n₁n₂n₃ and n₄n₅n₆ can be chosen among the group comprising the following nucleotide codons:

- GCT, GCC, GCA, GCG
- GTT, GTC, GTA, GTG,
- TTA, TTG, CTT, CTC, CTA, CTG,
- ATT, ATC, ATA,
- TTT, TTC,
- ATG,
- CCT, CCC, CCA, CCG,
- TGG.

FIGURE 16A

Joined CDS for the IL-11 mutein which derives from the 21aa-deleted human IL-11 – SEQ ID NO:71:-

cct ggg cca cca cct ggc ccc cct cga gtt tcc cca gac cct cgg gcc gag ctg gac agc acc gtg ctc ctg acc cgc tct ctc ctg gcg gac acg cgg cag ctg gct gca cag ctg agg gac aaa ttc cca gct gac ggg gac cac aac ctg gat tcc ctg ccc acc ctg gcc atg agt gcg ggg gca ctg gga gct cta cag ctc cca ggt gtg ctg aca agg ctg cga gcg gac cta ctg tcc tac ctg cgg cac gtg cag tgg ctg egc cgg gca ggt ggc tct tcc ctg aag acc ctg gag ccc gag ctg ggc acc ctg cag gcc cga ctg gac cgg ctg cgc cgg ctg cag ctc ctg atg tcc cgc ctg gcc ctg ccc cag cca ccc ccc gac ccg ccg ggg ccc ccg ctg gcg ccc ccc tcc tca gcc tgg ggg ggc atc agg gcc cac gcc atc ctg ggg ggg ctg n₁n₂n₃ ctg aca ctt n₄n₅n₆ tgg gcc gtg agg gga ctg ctg ctg aag act cgg ctg tga

wherein the codon n₁n₂n₃ and the codon n₄n₅n₆ are as defined in Figure 16A.

Joined CDS for the IL-11 mutein which derives from the complete human IL-11 –SEQ ID NO:72:-

atg aac tgt gtt tgc cgc ctg gtc ctg gtc gtg ctg agc ctg tgg cca gat aca gct gtc gcc cct ggg cca cca cct ggc ccc ccc cct cga gtt tcc cca gac cct cgg gcc gag ctg gac agc acc gtg ctc ctg acc cgc tct ctc ctg gcg gac acg cgg cag ctg gct gca cag ctg agg gac aaa ttc cca gct gac ggg gac cac aac ctg gat tcc ctg ccc acc ctg gcc atg agt gcg ggg gca ctg gga gct cta cag ctc cca ggt gtg ctg aca agg ctg cga gcg gac cta ctg tcc tac ctg cgg cac gtg cag tgg ctg cgc cgg gca ggt ggc tct tcc ctg aag acc ctg gag ccc gag ctg ggc acc ctg cag gcc cga ctg gac cgg ctg cgc cgg ctg cag ctc ctg atg tcc cgc ctg gcc ctg ccc cag cca ccc ccc gac ccg ccg ggg ccc ccg ctg gcg ccc ccc tcc tca gcc tgg ggg ggc atc agg gcc cac gcc atc ctg ggg ggg ctg n₁n₂n₃ ctg aca ctt n₄n₅n₆ tgg gcc gtg agg gga ctg ctg ctg aag act cgg ctg tga

wherein the codon n₁n₂n₃ and the codon n₄n₅n₆ are as defined in Figure 16A.

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Mutated AY207429 nucleic acid -SEQ ID NO:74:-

1 acacctgtat tcccaccact ttggggaggt gaggcgggag gatgacctga gctcaggagt
 61 ttgagaccag cctggcaac atggcaaaac cctatctcta ctaaaaatac aaaaaatagc
 121 caggcatgtt ggcgggtgcc tctaattccca gctactcagg aggctgaggc atgagaatca
 181 cttgaacctg ggaggcggag gttacagtga gctgagatca caccactgca ccccgacgctg
 241 ggtgacacag cgagactctg tctcaaaaaa accaaaaacg agggcaggca cggtagctca
 301 cacctgtcat cccagcaatt tgggaggccg aggaggcggg atcacgaagt caggagttcg
 361 agaccagcct ggccaacatg gtaagacccc gtctctacta aaaatacaa attaqccggg
 421 tgtgttggcg cacacctgtat atccccacta cttgggaggc tgagggcagga gaatcgcttg
 481 aaccggggag gtggagggtt cagttagctg agattgtgcc attgatcgctg ccattgcact
 541 ccagcctggg tgacagatg agactcagta ccaaaaaaca aacaaacaaa aaacaaacaa
 601 aaaatgagaa aggctttac tctctgcccc cattgtctgag tccccacat ctacgcgtct
 661 ctgtctttct aataatctctg tctccctt tctgtccctg gggcctctcc gtcctgtca
 721 ctctgccccg tgcctctgtt tgcctgggtc ctttcttcag ctgcggcatt ctctgtctca
 781 gagtcttggc gtctctgttc ctttccccc ggggtctccc tgggtctccc caagtccctc
 841 ctgctgtctt ctcggcgtc tctgatctt gactccaga acctctccct ctgtctccag
 901 ggcgtccctt ctgatccatct ttgcttctt ggtgtgtctc tctggctgcc tccatctctg
 961 tggatctccg tctccctgtc tctgtctcag tctgtccctc actctgtgtg tgggtgtgtg
 1021 tgtctctctc tctctctctc cttcccttcc actcccttcc cttccctgtt ccacctctcc
 1081 aggccctctgt cttgtccctc cgtccggcct ttctctgtcc ttccgtcttc ctgcctccccc
 1141 atctctctctc gctagtcctg gtccagccgg accccccaccc acagtcggc ccoagcgtt
 1201 gagectgtat gtctgtcccg gcccgtggag gtggaggagg gggacgcgg tgacctcacc
 1261 agccctcttc cgaccacccc cccctttccc ttttcaactt ttccaactt tccttcgtg
 1321 ccctctctcg agcgcggcgg cgtgaggccct gcaaggcagc cgtccgtct gaatggaaaa
 1381 ggcaggcggg gagggtgagt caggatgtgt caggccggcc tccctgtcc cctggccccc
 1441 gcccggcccg cccagccccc tatataaccc cccaggcgtc cacaactt cactggcccg
 1501 gcccgtgtc tcaggccaca tgcctccct ccccaggccg cggcccaactt gacccctggg
 1561 gctcccccgg cagggacac ggaagggtt aaggccccgg gctccctgtcc ccctgccttg
 1621 gggAACCCCTT ggccctgtgg ggacatgaac tggtaagttgg ttcatgggg ggggggggg
 1681 gacaggggagg caggaggagg agggacccac ggcgggggtt ggagcagacc ccgtgagtc
 1741 gcacagagag ggacccggag acaggcagcc ggggaggaga gcaaggacac gatggagca gccaatcaga
 1801 cggcggaggaa gatgggcaga gagagacaca gacaggagcg gacggcggc gggcgggggg
 1861 ggcgcgcgcag gaggacggg ccagacaggg ccccgagagg gacggcggc gggcgggggg
 1921 gcagggggcag ggacgcaggg actgggtccg ggaggggagg gacccccatc gaccgggg
 1981 ccagggagcc cgcggggacc gggagactcc ctgggatcc ggcagagagg ctccggaggg
 2041 aaactgaggc agggtcccg gagagcggag caaggcaggg agtagcgtacc ccagccgggg
 2101 ggaggagaga gactgggcgc ggggggaaag cggggagagc cgggcagatg cggcggacgg
 2161 aggccgcggc acaccgacgg ctggcggggcc cggggggccgg gctgggggtt tgccggggc
 2221 gggcggccgg ggagcgctga ttggctggcg ggtggccggg tggcggggccggc ggcgggggtt
 2281 gctgtggggg agcgagctcc ggaccccccgc gcccccccgcc ccccccggc ccccccggc
 2341 cagctctccc gctcccgccg cccggccggg cccatggctc tgccctcttc cgeccaggtg
 2401 cgctgcggcc cgggttctg ccggccaccc ggcggggctc ctgggaggcc gtcataagggg
 2461 tctccctgtt gagaggtccg tgcctccctt gtcctgtctt ggcttctgg tccttccct
 2521 gctccctgtt agctcggtt ccccgccccc ggggggggggggggggggggggggggggggg
 2581 ccccaaccatg ccccgccccc gggcccagat tccggcgtcc gggggccggac gggagacgccc
 2641 cggcccgctt accccggcccg ggcggcggtt gtcctgttcc gggggggccggc cagagccagg
 2701 gagggagagg gaagccgc tggccctgcg acctgcccgc gggcgttcca ccctgggact
 2761 taagacctcc agctccatcc tcccttaagcc cgggagttcca gggcccccagac cctccctccccc
 2821 gagaccagg agtccagacc ccaggccttc ctccctcaga ccttagggatc cagggccccc
 2881 gcctctccctt cctcagaccc aggaggagtc cagaccccaat ttccctccctt ctcagaccc
 2941 ggagtccagg cccaggccctt cctctctctg accccggagtc cagcgttcc gtcctgttcc
 3001 atccctggccc cagggttttgc cggcctggcc tgggtctgtc tgagggctgtg gccagataca
 3061 gctgtcgccc ctggggccacc acctggccccc cctcgatgtt ccccgagaccc tggggccggag
 3121 ctggacagca ccgtgtctt gaccggctt ctccctgggg acacgcggca gtcggctgca
 3181 cagctggtag gagagactgg gctggggccca gcacaggagt gagaggcaga gaggaaacggg

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341 gaggagtctg cgggcagcca cttggagggg ttctgggctc tcaggtggca gagtgaggga
3301 ggggaagagt tggggccctg gcgtggggga tggagggagc cccgaggctg ggcaggggcc
3361 acctcacagc ttttccct gcoagagggg caaatcccc gctgacgggg accacaacct
3421 ggattccctg cccaccctgg ccatgagtgc gggggcactg ggagctctac aggttaaggc
3481 aagggagtgg gctgggaca aggtggggg caggcagtga agggggcggg gaggatgagg
3541 ggcactggc gggtgttctc tgatgtccc gctctatccc cagctccag gtgtctgac
3601 aaggctgcga gcgacccctac tgtcttaccc gcccacgtg cagtggctgc gcccggcagg
3661 tggcttcc ctgaagaccc tggagccca gctgggcacc ctgcagggcc gactggaccg
3721 gctgtgcgc cggctgcagc tcctggatg tcctggccc aagacctgac accccagacc
3781 cccaccctg gccccaaaat cctgtggct gactccttga agcctgagac cccagaccg
3841 agtcaacag ccccgctctg agaccctgac accctaacag cccgctctga gaccctgaca
3901 ccgttaacagc cccgctctga gaccctgacc ctaacagtcc tgcctgaga ccctgaccct
3961 gcagtcccaa gatccctgtgg ccctgagacc ctgagggccct agaccccaa atccgtccca
4021 gaaacttcaa attctcaccc aagaccctga gactccatca tccatgaccc caaagtcccc
4081 agatcccagc ccctaagacc caagacccca tcctgaagcc caaagcctt agaattcaaa
4141 tcctcaccc aagacttgg aaccctggcc ccatgacatt gaaaaccatg gacccggcc
4201 ggcgtgtgg ctcacccctg taatccccc acttggag gccgaggccaa gtggatcacc
4261 tgaggtcggg agttcaagac cagccagacc aacatggtga aaccctgtct ctactaaaaaa
4321 taaaattt gccaggctg gtgggtcatg cctgtatcc cagctactt ggaggcttag
4381 gcaggaaat cgcttgaacc tgggaggccg aggttgcagi gagccgagat cgcaccattt
4441 cactccagcc tggcaacaa gagcaaaact ccctctctt caaaaaaaaaaa
4501 aaaagaagga aaagaaaaacc atggacccctt agaccctgag accccagcc ccagccctga
4561 gatctgaca tcttaagat cccaggccct aagatacaag accttgaccc aaagccagcc
4621 ttgggaccct ggctgtacaa acccaagacc tccaggaccc agaccggag ccctgaggcc
4681 ctatgtctca ctcccaacat cgaaaacctt gacacccctg atcctgagcc tgcctgta
4741 cgactccaag accctcactt ccaaagccag gcccaaagcc ctgagaccag aagacttcaa
4801 accctggttc ttgggcttaa ctccaaagac cctggatctc aaattccaaat ttctagctct
4861 gagactccag ccctcacccca ttagttctt aacttgaacc cagagacccc atctctaaga
4921 cttcagccct gagatccagg gcctgaccct ccacagaccc ctagatactgt
4981 ctgtaaaacc ccagctctgg tgggagccag tggctcaactc ctgtatccc aaggcagggg
5041 aggccaaggc agaaggaccc ttggaggcca tgggttgag acagccctgg cagcatagca
5101 agactctgtt tcttaatttatt tattattttt attattttt ggagacagag tctcgcgtc
5161 tggcccacag gctagagtgc aatggtgcca ttcggcttgc ctggacccctc ogccctctgg
5221 gctcaagcga ttctcctgcc tcagccctctt gacttagctgg gacttcaggt gcacactgccc
5281 acacccggat aattttttt tatttttagta gacacagggt ttcaccgtgt tgcccaggct
5341 ggtcacaaac ccctgagctc aggccatccg cccgcctcgg cctcccaaag cgctggata
5401 acaggcgtga tcccgcgcgc ctggcttctt aattgttcta acagcagccca caacaacaaa
5461 aacccagctc tgagattcca gccccggcga ctctaaactg cccaggcccg atccctcacc
5521 tagaaccggag atgcacggcc tgactccaca gacttcaccc ccaaccccca cactcagctc
5581 tggaaaggcccg tcctgactcc agccctccat ttcggaaacc cacagccctga agactcccg
5641 gcctaaacac ttccacccac gogccacagt cccctgtga atatgcagcc ccgattcagc
5701 tgcagctcca cagcacccctt gcccgtccacc cccgtgcac cccctactt tgactcaccc
5761 ctctccctcc cccacagatg tcccgcctgg ccctggccca gccacccccc gaccgcgg
5821 cggcccccgtt ggccggccccc tcctcagctt gggggggcat cagggccccc cacccatcc
5881 tgggggggtt an,n₂,n₃ctgaca cttn_nn₅n₆tggg ccgtgagggg actgtctgt ctgaagact
5941 ggctgtgacc cggggcccaa agccacccca gtccttccaa agccagatct tattttttt
6001 tttatttcag tactggggc gaaacagcca ggtgatcccc cgcatttat ctccccctag
6061 ttagagacag tccttccctg aggccctggg ggcattgtg ctttatttat acttatttt
6121 ttcaggagca ggggtgggag gcaagggtggac tcctgggtcc cggaggagga gggactggg
6181 gtcccccattt ctgggtctc caagaagttt gtcacccagac ttctggcttgc gctctccccc
6241 atctaggccct gggcaggaac atatattttt tatttaagca attactttt atgttgggg
6301 ggggacggag gggaaaggga agccctgggg tttgtacaaa aatgtgagaa acctttgtga
6361 gacagagaac agggaaattaa atgtgtcata catatccact tgagggccat ttgtctgaga
6421 gctggggctg gatgttggg taactggggc agggcagggtg gaggggagac ctccattcag
6481 gtggaggtcc cgagttggcg gggcagccac tggagatgg gtcgggtcacc cagacagctc
6541 tggggggggca ggggtctgac ctggcttgc gccccggact gcatagggcc gtttttttgt

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6601 tttttgagat ggagtctcg tctgttgctt aggctggagt gcagtgaggc aatctaagg
 6661 cactgcaacc tccacccccc gggttcaagc aattcttcctg cctcagccctc ccgatttagct
 6721 gggatcacag gtgtgcacca ccatgcccag ctaattattt atttcttttgc tatttttagt
 6781 agagacaggg tttcaccatg ttggccaggc tggtttcgaa ctccctgaccc caggtgatcc
 6841 tcctgcctcg gcctccaaa gtgctggat tacaggtgtg agccaccaca cctgaccat
 6901 aggttctcaa taaatattt atggaagggtt ccacaagtca ccctgtgatc aacagtaccc
 6961 gtatgggaca aagctgcaag gtcaagatgg ttcattatgg ctgtgttac ctagcaaac
 7021 tggaaacaat ctagatatcc aacagtgggg tttaagcaac atggtgatc tggataga
 7081 acgccaccca gccccccggc gcagggactg tcattcaggg aggctaagga gagaggcttg
 7141 cttgggatata agaaagatata cctgacattt gcccaggcatg gtggctcactg cctgtaatcc
 7201 tggcacttgc ggagggacgaa gcgagtgatgg cactgaagtc caagagttt agaccggcct
 7261 gcgagacatg gcaaaaccct gtctaaaaaa agaaagaatg atgttctgac atgaaacagc
 7321 aggctacaaa accactgcat gctgtgatcc caattttgtt ttttcttcc tatatatgg
 7381 taaaacaaa aatctaaag gaaaataacgc caaaatgtt acaatgactg tctccagg
 7441 aaaggagaga ggtgggattt tgggtgactt ttaatgttgc tgattgtctg tattttacag
 7501 aatttctgcc atgactgtgtt attttgcattt acacattttt aaaataataa acactatttt
 7561 tagaataaca gaatatcaggc ctccctctt ccaaaaataa gccctcagga ggggacaagg
 7621 ttgaccgctg attgagcctg tcagggctgt gcactaagtgc tgggctttt acttacacaa
 7681 tcctccttggc ctcttgcata cgcctgttt tacaggcgg gggaaactgag tctcagacaa
 7741 ggagtggggc ctcttgcata caaagtccaca cagctaggga gagggtggaa tgggattctg
 7801 cgccgtgtct ggcttccccc caaagctctc ttttgcagtc ggtgttgggg aatccctgccc
 7861 acatgcacac acatgagata tggagaaaca ggttcagtaa ggatttgggtt cttacccagg
 7921 gccttagagaa gggtaatgg cagagtaggg atgataattt aaatgcttta gttactttt
 7981 ccttacaat aaccacagaca gacttccagg ggccccgtgt cgtcactagt ttgagtctgg
 8041 gtttggaggt gcccattctg gggccggagt ttttgcatttcc ccatcatagc cctcaagact
 8101 ccaggctggc tggggcggtt ggcttccccc ttttgcatttcc cacttttttggggaggctgg
 8161 ggggtggatca ctttgcatttgc gggttcaag gcccggctt ccaacatggc gaaaccctgt
 8221 ctctactaaa aatacaatcc agtactctgg aaggctgggg caggagaatc gctcgaaacc
 8281 aggagacggg gtttgcgggtt agccggatc acatcacaatcc cagcccttgggggggg
 8341 ccccaaggcgcgatc ggcttccccc ttttgcatttcc gagctgttgc ggttgcatttgc
 8401 ggaggcgggg ttttgcatttgc cccctggggc cccctggggc ttttgcatttgc taaggctt
 8461 atggagtttc gcttgcatttgc ttttgcatttgc gtttgcatttgc gcaatctttaa
 8521 gggcaacaatcc agtggatccatc catctccaaa aacaaaaaaac aaacaaacaaa
 8581 ccaggctgttgc tccctggggc agaaggggggcc cccatgttttttttttttttttttttttt
 8641 cccctgtgttgc tccatgttgc ttttgcatttgc ttttgcatttgc ttttgcatttgc
 8701 tgctgtccac ccttgcatttgc ttttgcatttgc ttttgcatttgc ttttgcatttgc
 8761 acgttctgttgc acgttgcatttgc ttttgcatttgc ttttgcatttgc ttttgcatttgc
 8821 cggggcttggc aggcttgcatttgc ttttgcatttgc ttttgcatttgc ttttgcatttgc
 8881 agccaccatc atctggcttc gaaacaggatc gtttgcatttgc ttttgcatttgc
 8941 gtgggtccct gtttgcatttgc ttttgcatttgc ttttgcatttgc ttttgcatttgc
 9001 ccgttcccttgc cccatgttgc ttttgcatttgc ttttgcatttgc ttttgcatttgc
 9061 ggcttgcatttgc ttttgcatttgc ttttgcatttgc ttttgcatttgc ttttgcatttgc
 9121 ggttttgcatttgc ttttgcatttgc ttttgcatttgc ttttgcatttgc ttttgcatttgc
 9181 aggaaggatc ggttttgcatttgc ttttgcatttgc ttttgcatttgc ttttgcatttgc
 9241 cagtgttgcatttgc ttttgcatttgc ttttgcatttgc ttttgcatttgc ttttgcatttgc
 9301 ggcttgcatttgc ttttgcatttgc ttttgcatttgc ttttgcatttgc ttttgcatttgc
 9361 ggcttgcatttgc ttttgcatttgc ttttgcatttgc ttttgcatttgc ttttgcatttgc
 9421 gtttgcatttgc ttttgcatttgc ttttgcatttgc ttttgcatttgc ttttgcatttgc
 9481 cgttttgcatttgc ttttgcatttgc ttttgcatttgc ttttgcatttgc ttttgcatttgc
 9541 ctt
 9601 catcaaccatc ttttgcatttgc ttttgcatttgc ttttgcatttgc ttttgcatttgc
 9661 ctt
 9721 gtttgcatttgc ttttgcatttgc ttttgcatttgc ttttgcatttgc ttttgcatttgc
 9781 cggccatgttgc ttttgcatttgc ttttgcatttgc ttttgcatttgc ttttgcatttgc

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wherein the codon n₁n₂n₃ and the codon n₄n₅n₆ are as defined in Figure 16A.**FIGURE 17**

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mRNA of IL-11 mutein deriving from human IL-11 -SEQ ID NO:75:-

gaa ggg uua aag gcc ccc ggc ucc cug ccc ccu gcc cug ggg aac ccc ugg ccc ugu ggg gac aug
aac ugu guu ugc cgc cug guc cug gug cug agc cug ugg cca gau aca gcu guc gcc ccu ggg
cca cca ccu ggc ccc ccu cga guu ucc cca gac ccu cgg gcc gag cug gac acc gug cuc cug acc
cgc ucu cuc cug gcg gac acg cgg cag cug gcu gca cag cug agg gac aaa uuc cca gcu gac ggg
gac cac aac cug gau ucc cug ccc acc cug gcc aug agu gcg ggg gca cug gga gcu cua cag cuc
cca ggu gug cug aca agg cug cga gcg gac cua cug ucc uac cug cgg cac gug cag ugg cug cgc
cgg gca ggu ggc ucu ucc cug aag acc cug gag ccc gag cug ggc acc cug cag gcc cga cug gac
cgg cug cug cgc cgg cug cag cuc aug ucc cgc cug gcc cug ccc cag cca ccc ccc gac ccc ccg
gca ccc ccc cug gcg ccc ccc ucc uca gcc ugg ggg ggc auc agg gcc cac gcc auc cug ggg
ggg cug n₁n₂n₃ cug aca cuu n₄n₅n₆ ugg gcc gug agg gga cug cug cug aag acu cgg cug uga
ccc ggg gcc caa agc cac cac cgu ccu ucc aaa gcc aga ucu uau uua uuu uau uuc agu acu
ggg ggc gaa aca gcc agg uga ucc ccc cgc cau uau cuc ccc cua guu aga gac agu ccu ucc gug
agg ccu ggg ggg cau cug ugc cuu auu uau acu uau uua uuu cag gag cag ggg ugg gag gca ggu
gga cuc cug ggu ccc cga gga ggg gac ugg ggu ccc gga uuc uug ggu cuc caa gaa guc ugu
cca cag acu ucu gcc cug gcu cuu ccc cau cua ggc cug ggc agg aac aua uau uua uuu aag
caa uua cuu uuc aug uug ggg ugg gga cgg agg gga aag gga agc cug ggu uuu ugu aca aaa aug
uga gaa acc uuu gug aga cag aga aca ggg aau uaa aug ugu cau aca uau cca cuu gag ggc gau
uug ucu gag agc ugg ggc ugg aug cuu ggg uaa cug ggg cag ggc agg ugg agg gga gac cuc cau
uca ggu gga ggu ccc gag ugg gcg ggg cag cga cug gga gau ggg ucg guc acc cag aca gcu cug
ugg agg cag ggu cug agc cuu gcc ugg ggc ccc gca cug cau agg gcc guu ugu uug uuu uuu gag
aug gag ucu cgc ucu guu gcc uag gcu gga gug cag uga ggc aau cua agg uca cug caa ccc cca
ccu ccc ggg uuc aag caa uuc ucc ugc cuc agc cuc ccg aau agc ugg gau cac agg ugu gca cca
cca ugc cca gcu aau uau uua uuu cuu uug uau uuu uag uag aga cag ggu uuc acc aug uug gcc
agg cug guu ucg aac ucc uga ccu cag gug auc cuc cug ccu cgg ccu ccc aaa gug cug gga uua
cag gug uga gcc acc aca ccc gac cca uag guc uuc aau aaa uau uua aug gaa ggu ucc aca agu cac
ccu cug auc aac agu acc cgu aug gga caa gcu gca agg uca aga ugg uuc aau aug gcu gug uuc
acc aua gca aac ugg aaa caa ucu aga uau cca aca gug agg guu aag caa cau ggu gca ucu gug

FIGURE 18

gau aga acg cca ccc agc cgc ccg gag cag gga cug uca uuc agg gag gcu aag gag aga ggc uug
cuu ggg aua uag aaa gau auc cug aca uug gcc agg cau ggu ggc uca cgc cug uaa ucc ugg cac
uuu ggg agg acg aag cga gug gau cac uga agu cca aga guu uga gac cgg ccu gcg aga cau ggc
aaa acc cug ucu caa aaa aga aag aau gau guc cug aca uga aac agc agg cua caa aac cac ugc aug
cug uga ucc caa uuu ugu guu uuu cuu ucu aua uau gga uua aaa caa aaa ucc uaa agg gaa aua
cgc caa aau guu gac aau gac ugu cuc cag gac aaa gga gag agg ugg gau ugu ggg uga cuu uua
aug ugu aug auu guc ugu auu uua cag aau uuc ugc cau gac ugu gua uuu ugc aug aca cau uuu
aaa aau aau aaa cac uau uuu uag aau

wherein the codon $n_1n_2n_3$ and the codon $n_4n_5n_6$ are both chosen among the group comprising the nucleotide codons which codes for a hydrophobic aminoacid, namely for Alanine (A), Valine (V), Leucine (L), Isoleucine (I), Phenylalanine (F), Methionine (M), Proline (P), Tryptophan (W).

$n_1n_2n_3$ and $n_4n_5n_6$ can be chosen among the group comprising the following nucleotide codons:

- GCU, GCC, GCA, GCG
- GUU, GUC, GUA, GUG,
- UUA, UUG, CUU, CUC, CUA, CUG,
- AUU, AUC, AUA,
- UUU, UUC,
- AUG,
- CCU, CCC, CCA, CCG,
- UGG.

FIGURE18

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Gene of IL-11 muteins deriving from human IL-11 – SEQ ID NO:76:-

gaagggtta aaggcccccg gctccctgccc ccctgcctcg
 gggaaaccctt ggccctgtgg ggacatgaac tgtaagttgg ttcatgggaa ggggtggaggg
 gacaggggagg cagggaggag agggaccac ggcgggggtg ggagcagacc ccgctgagtc
 gcacagagag ggacccggag acaggcagcc ggggaggaga gcagcttcgg agacaggagg
 cggcggagga gatgggcaga gagagacaca gacaggagcg gatggagggca gccaatcaga
 ggccgcgcag gaggacggg ccagacaggg ccccagagg gagcagacg cggagaccga
 gcagggggcag ggacgcaggg actgggtccg ggagggagg gaccccccattc gaccaggccc
 ccagggagcc cgccggggacc gggagactcc ctggattcc ggcagagagg ctccggaggg
 aaactgaggc agggtcccg gagagcggag caagccaggg agtagcggacc ccagccgggg
 ggaggagaga gactggcgc ggggggaaag cggggagagc cgggcagatg cggccgacgg
 aggccgggac agaccgacgg ctggcgggac cggggggcgg gctgggggtg tgcgaggcgc
 gggcggccgg ggagcgtga ttggctggc ggtggccggg tggggggggc ggcgggggtg
 ggctgcgggg agcgagctcc ggaccccccgc gcccccccgcc ccccccgcgc ccccccgcgc
 cagctctcc gctcccgcc cccggccggg cccatggc tcgccccttc cgcggcagg
 cgctgcggcc cgggttctg cggccaccc ggcggggcgc ctgggagggc gtctaagggg
 tctccctgg gagaggtccg tgctccccc gtcctgttc gcttctggc tcctccct
 gtcctccaggc agtcgggct cccggggcc ggggaggggg cagttctgg cctgtgcctc
 cccaccatg cccggccccc gggcccaat tccggcgtcc ggggggggac gggagacggc
 cggcccgctt accccggcccg ggcgcgtct gtcggcggc gggggggcgc cagagccagg
 gagggagagg gaagccgccc tggccctgcg acctggccgc gggcgttcca ccctgggact
 taagacctcc agtcctcatcc tccctaaggc cgggagttca gggcccaatc ccttccccc
 gagaccaggc agtccagacc ccaggcctc ctccctcaga ccttaggagtc caggccccca
 gcctcttc cctcagaccc aggaggagtc cagaccccaat ttcccttc ctcagaccc
 ggagtccagg cccaggccct cctctctcag accccggagtc cagcctgagc tctctgcctt
 atccctgcccc caggttttg cggcctggc ctggctgtgc tgagcctgtg gccagataca
 gctgtcgccc ctgggccacc acctggccccc cctcagatcc cccagaccc tcggccgag
 ctggacagca ccgtgtctt gacccgctt ctccctggc acacgcggca gctggctgca
 cagctgttag gagagactgg gctggggca gacaggagt gagagggcaga gaggaaacgg
 gaggagtctg cggcagcca cttggagggg ttctgggctc tcaggtggca gagtgaggga
 ggggaagagt tggggcctg gctgggggaa tggagggagc cccgaggctg ggcaggggcc
 acctcacagc tttttccctt gccagagggc caaatccca gctgacgggg accacaacct
 ggattccctg cccaccctgg ccatgagtgc gggggcaactg ggagctctac agtaagggg
 aaggagttgg gctggggaca aggtggggagg caggcgtga aggggggggg gaggatgagg
 ggcactggtc gggtgttctc tgatgtcccg gctctatccc cagctcccaat gtgtgctgac
 aaggctgoga gcggaacctac tggcttaccc gggcacgtg cagtggtc gccggccagg
 tggcttccctc ctgaagaccc tggagccca gctggggcacc ctgcaggccc gactggacc
 gctgtcgcc cggctgcagc tcctggatg tcctggccccc aagacctgac accccagacc
 cccaccctt gccccaaaat ctgtggcct gacttccatcc agcctgagac cccagaccc
 agtcaacacg ccccgctctg agaccctgac accctaacaat cccgctctg gaccctgaca
 cctgtaacagc cccgctctg gacccctgacc ctaacagtcc tgctctgaga ccctgacc
 gcaagtccaa gatccctgtgg ccctgagacc ctgaggccct agaccccaa atcctgc
 gaaacttcaa atttcaccc aagaccctgaa gactccatca tccatgaccc caaagtcccc
 agatcccaatc ccctaagacc caagacccca tcctgaagcc caaaggctt agaattccaa
 tcctcaccc aagacttggg gaccctggcc ccatgacatt gaaaaccat gacccggca
 ggcgtgggtt ctcacgcctg taatcccaatc acttggggag gccgaggccaa gtggatcacc
 tgaggtcggtt agttcaagac cagccagacc aacatggtga aaccctgtt ctactaaaa
 tacaaaaat tggggcctt ggg
 gcaaggagaat cgcttgaacc tgg
 cactccagcc tggggcaacaa gagccaaatcc ctccctctt caaaaaaaaaaaaaaa
 aaaagaagga aaagaaaaacc atggacctcc agaccctgag accccaggcc ccagccctg
 gatccctgaca tcttaaagat cccaggccct aagatacaag accttgaccc aaagccagcc
 ttgggaccctt ggctgtacaa acccaagacc tccaggaccc agaccccgag ccctgaggcc
 ctatgtctca ctcccaacat cggaaaaccctt gacaccttag atcctgagcc tgcgcctgta
 cgactccaat acccttactt cccaaaggccag gccccaaagcc ctgagaccagg aagacttcaa
 accctggttt ttggggctaa ctccaaagac cctggatctc aaattccaaat ttctagctt
 gagactccag ccctcacccca tggatccctg aacttgaacc cagagaccc acccttccaa
 cttcagccctt gagatccagg gcctgaccctt agactcgagc ccacagaccc cagatactgt

FIGURE 19

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ctgtaaaacc ccagctctgg tggggagcag tggctcaactc ctgtaatccc aaggcagggg
 aggccaaggc agaaggaccc ttgaggcca tgagttttag acagcctggg cagcatagca
 agactctgtt tcataattat tattattatt attattttt ggagacagag tctcgcgctc
 ttttgcggag gctagagtgc aatggtgcca ttccggcttgc ctggAACCTC CGCCCTGG
 gtcagaagcga ttctctgccc tcagcctcct gagtagctgg gacttcagggt gcacactgcc
 acacccggat aattttttgc tatttttagta gacacagggt ttcacogtgc tgcccaggct
 ggtcacaaac tcctgagctc aggccatccg cccgcctcg cctccaaag cgctggata
 acaggcgtga tccccggcgc ctggcttctt aattgttcta acagcagcc caacaacaaa
 aacccagctc tgagattcca gccccggcga ctctaacagt cccaggcccg atccctcacc
 tagaaccgag atgccagccc tgactccaca gacttcaccc ccaaccccca cactcagctc
 tggaaaggcccg tcctgactcc agccctccat ttcggaaaccc cacagcctga agagctcccg
 gcttaaacac ttccacccac ggcacacatc cccctgtga atatgcagcc cgcattcagc
 tgcagctcca cagccccctt gccctgcacc cccgtgcac cccctacctg tgactcacct
 ctctcccttc cccacagatg tcccgcttgc ccctgccccca gccacccccc gaccggccgg
 cggcccccgtt ggcggccccc tcctcagct gggggggcat caggccggcc cacggccatcc
 tggggggggtt gn₁n₂n₃ctgaca cttn₄n₅n₆tggg ccgtgagggg actgctgctg ctgaagactc
 ggctgtgacc cggggcccaa agccacccacc gtccttccaa agccagatct tattttat
 ttatattcag tactgggggc gaaacagcca ggtgatcccc ccgcattat ctcccccttag
 ttagagacag tccttcgtg aggccctggg ggcacatctgtg ctttatttat acttatttat
 ttcaggagca ggggtgggag gcagggtggac tcctgggtcc ccgaggagga ggggactggg
 gtcccgatt ctgggtctc caagaagtc gtccacagac ttctgccttgc gctctccccc
 atctaggccct gggcaggaac atatattatt tatttaagca attactttc atgttggggt
 ggggacggag gggaaaggga agcctgggtt ttgtacaaa aatgtgagaa acctttgtga
 gacagagaac agggaaattaa atgtgtcata cataatccact tgaggccat ttgtctgaga
 gctggggctg gatgcttggg taactggggc agggcagggtg gaggggagac ctccattcag
 gtggaggtcc cgagtggcg gggcagcgc tggagatgg gtcggtcacc cagacagctc
 tggggaggca gggctgtgacc ctgccttgc gcccccaact gcataggccc gtttgggtt
 tttttagat ggagtctcgc tctgttgcct aggctggagt gcaagtggc aatctaaggt
 cactgcaacc tccacccccc gggttcaagc aatttccttgc cctcagccctc ccgattagct
 gggatcacag gtgtgcacca ccatggccag ctaattattt atttcttttgc tatttttagt
 agagacaggg ttccacatg ttggccagc tgggttgc gtcctgaccc cagggtatcc
 tcctgcctcg gcctccaaa gtgctggat tacaggtgtg agccaccaca cctgaccatc
 aggtcttcaa taaatattta atggaaggtt ccacaagtca ccctgtgatc aacagtaccc
 gtatggaca aagctgcaag gtcaagatgg ttcatatgg ctgtgttac catagcaaac
 tggaaacaat ctagatatcc aacagtggg gttaagcaac atggtgcacatc tgtggataga
 acgccacccca gcccggcggc gcaggactg tcattcaggg aggctaagga gagaggcttgc
 cttgggatat agaaagatat ctgcacatg gcccaggcatg gtggctcact cctgtaatcc
 tggacttttggaggacgaa gggactggat cactgaagtc caagatgg agaccggcct
 gcgagacatg gaaaaaccct gtcataaaaa agaaagaatg atgtcctgac atgaaacagc
 aggctacaaa accactgcat gtcgtgatcc caattttgtg ttttttttgc tatatatgg
 ttaaaaacaaa aatcotaacag gaaaatacgc caaaatgttgc acaatgactg tctccaggc
 aaaggagaga ggtgggattt tgggtgactt ttaatgttgc tgattgttgc tattttacag
 aatttctgccc atgactgtgtt attttgcacat ttttgcacat ttttgcacat ttttgcacat
 tagaat

wherein the codon n₁n₂n₃ and the codon n₄n₅n₆ are as defined in Figure 16A.

FIGURE 19

Radioprotection of mice treated by FPΔII-1
after irradiation at 15 Gy

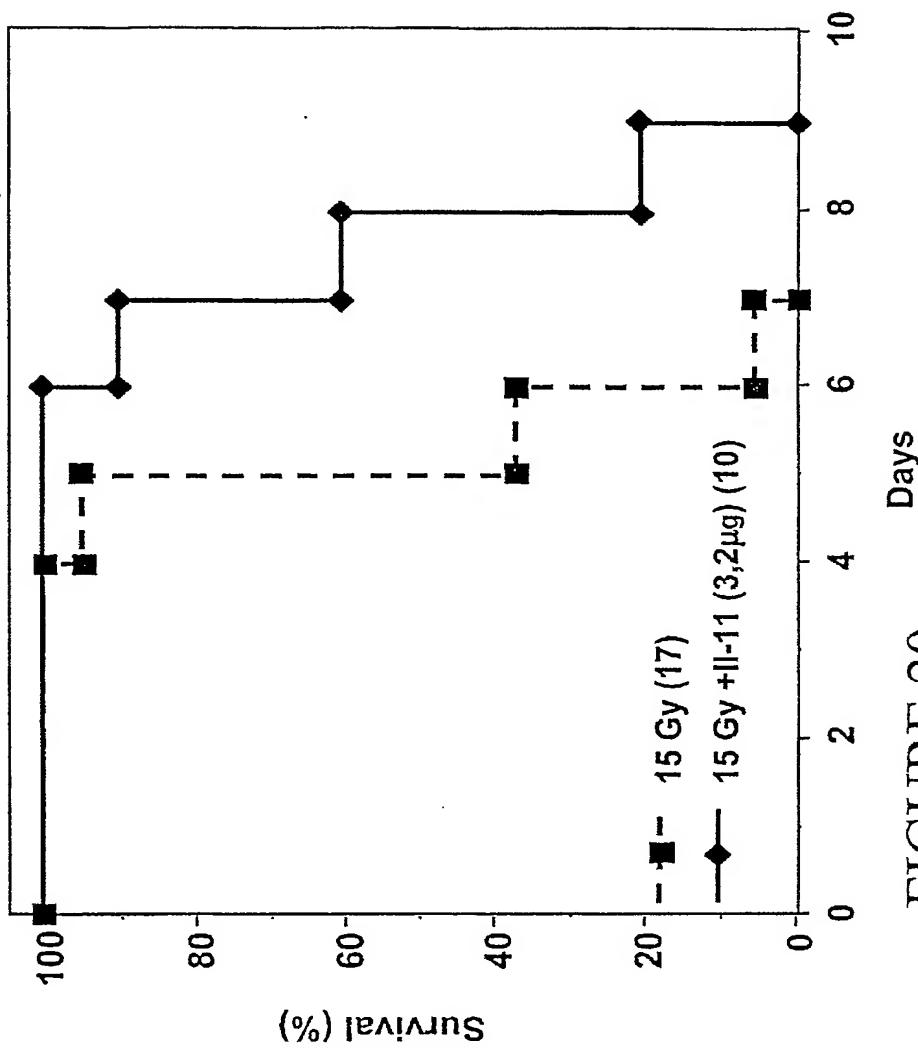


FIGURE 20

Low doses of FPAII-11 mutein delay the death mice irradiated at 15 Gy

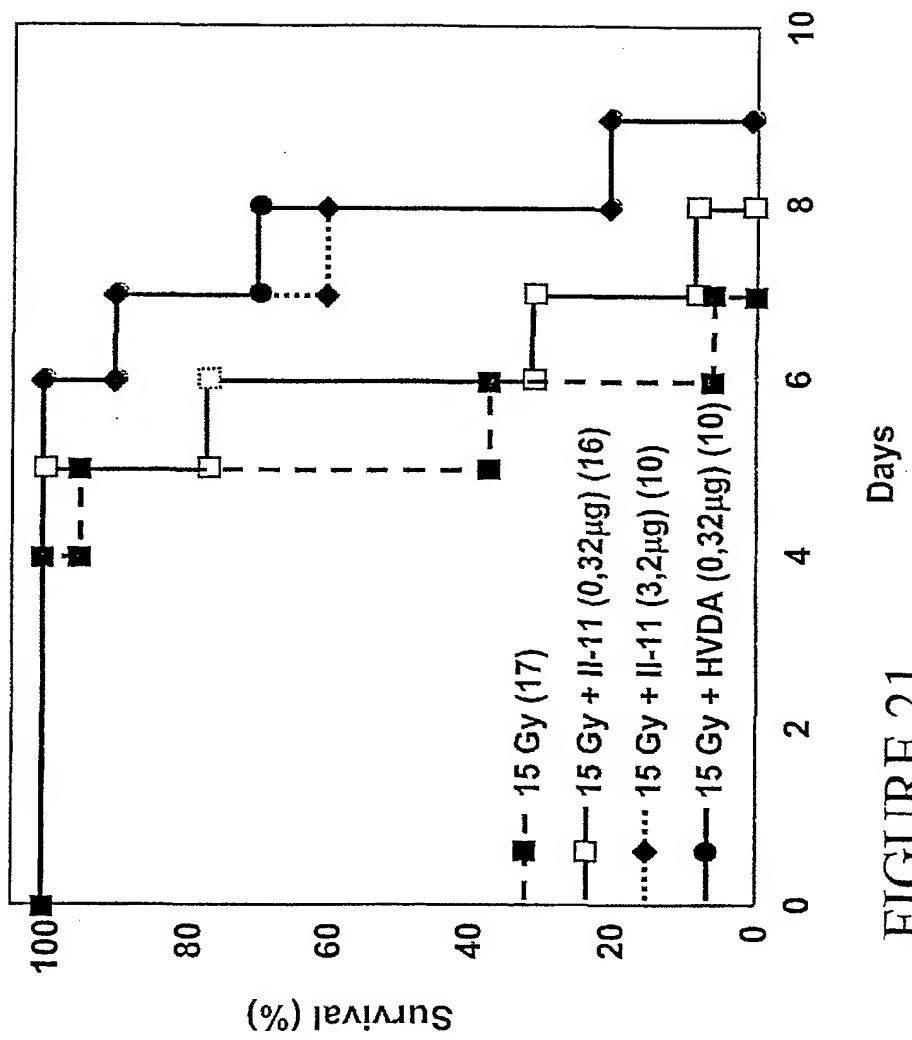


FIGURE 21

Parental (non-mutated) nucleotide sequence FPAIL-11 = SEQ ID NO:77 =

ATG GAC TAC AAG GAT GAC GAT GAC AAG GAA GGT CGT CGT GCA TCT
GTT GCA TCC CCA GAC CCT CGG GCC GAG CTG GAC AGC ACC GTG CTC
CTG ACC CGC TCT CTC CTG GCG GAC ACG CGG CAG CTG GCT GCA CAG
CTG AGG GAC AAA TTC CCA GCT GAC GGG GAC CAC AAC CTG GAT TCC
CTG CCC ACC CTG GCC ATG AGT GCG GGG GCA CTG GGA GCT CTA CAG
CTC CCA GGT GTG CTG ACA AGG CTG CGA GCG GAC CTA CTG TCC TAC
CTG CGG CAC GTG CAG TGG CTG CGC CGG GCA GGT GGC TCT TCC CTG
AAG ACC CTG GAG CCC GAG CTG GGC ACC CTG CAG GCC CGA CTG GAC
CGG CTG CTG CGC CGG CTG CAG CTC CTG ATG TCC CGC CTG GCC CTG
CCC CAG CCA CCC CCG GAC CCG CCG GCG CCC CCG CTG GCG CCC CCC
TCC TCA GCC TGG GGG GGC ATC AGG GCC GCC CAC GCC ATC CTG GGG
GGG CTG CAC CTG ACA CTT GAC TGG GCC GTG AGG GGA CTG CTG CTG
CTG AAG ACT CGG CTG TGA

Parental (non-mutated) amino acid sequence of FPAIL-11 = SEQ ID NO:78 =

MDYKDDDDKEGRRASVASPDPRRAELDSTVLLTRSLLADTRQLAAQLRDKFPA
DGDHNLDLPTLAMSAGALGALQLPGVLTRLRADLLSYLRHVQWLRRAGGSS
LKTLEPELGTIQLQARLDRLRRQLLMSRLALPQPPPDPPAPPLAPPSSAWGGIRA
AHAILGGLHLTLDWAVRGLLLLKTRL

Mutated nucleotide sequence of FPAIL-11 = SEQ ID NO:79 of the invention =

ATG GAC TAC AAG GAT GAC GAT GAC AAG GAA GGT CGT CGT GCA TCT
GTT GCA TCC CCA GAC CCT CGG GCC GAG CTG GAC AGC ACC GTG CTC
CTG ACC CGC TCT CTC CTG GCG GAC ACG CGG CAG CTG GCT GCA CAG
CTG AGG GAC AAA TTC CCA GCT GAC GGG GAC CAC AAC CTG GAT TCC
CTG CCC ACC CTG GCC ATG AGT GCG GGG GCA CTG GGA GCT CTA CAG
CTC CCA GGT GTG CTG ACA AGG CTG CGA GCG GAC CTA CTG TCC TAC
CTG CGG CAC GTG CAG TGG CTG CGC CGG GCA GGT GGC TCT TCC CTG
AAG ACC CTG GAG CCC GAG CTG GGC ACC CTG CAG GCC CGA CTG GAC
CGG CTG CTG CGC CGG CTG CAG CTC CTG ATG TCC CGC CTG GCC CTG
CCC CAG CCA CCC CCG GAC CCG CCG GCG CCC CCG CTG GCG CCC CCC
TCC TCA GCC TGG GGG GGC ATC AGG GCC GCC CAC GCC ATC CTG GGG
GGG CTG GTT CTG ACA CTT GCC TGG GCC GTG AGG GGA CTG CTG CTG
CTG AAG ACT CGG CTG TGA

Mutated amino acid sequence of FPAIL-11 = SEQ ID NO:80 of the invention =

MDYKDDDDKEGRRASVASPDPRAELDSTVLLTRSLLADTRQLAAQLRDKFPA
DGDHNLDSLPTLAMSAGALGALQLPGVLTRLRADLLSYLRHVQWLRRAGGSS
LKTLEPELGTLQARLDRLLRLQLLMSRLALPQPPPDPPAPPLAPPSSAWGGIRA
AHAILGGLVTLAWAAVRGLLLKTRL

FIGURE 23

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Primers used for inverse PCR mutagenesis of FPΔIL-11:

Muteins	Primers
H182/V	G422 pACACTTGA <u>T</u> CTGGGCCGTACGGGGAC (s) SEQ ID NO:81 G412 pCAG <u>AACC</u> AGCCCCCCCAGGATGG (as) SEQ ID NO:82
D186/V	G410 pACACTT <u>G</u> TCTGGGCCGTACGGGGAC (s) SEQ ID NO:83 G421 pCAGGTGCAGCCCCCCCAGGATGG (as) SEQ ID NO:84
D186/A	G411 pACACTT <u>G</u> CCTGGGCCGTACGGGGAC (s) SEQ ID NO:85 G421 pCAGGTGCAGCCCCCCCAGGATGG (as) SEQ ID NO:86
H182/V-D186/V	G410 pACACTT <u>G</u> TCTGGGCCGTACGGGGAC (s) SEQ ID NO:87 G412 pCAG <u>AACC</u> AGCCCCCCCAGGATGG (as) SEQ ID NO:88
H182/V-D186/A	G411 pACACTT <u>G</u> CCTGGGCCGTACGGGGAC (s) SEQ ID NO:89 G412 pCAG <u>AACC</u> AGCCCCCCCAGGATGG (as) SEQ ID NO:90

FIGURE 24

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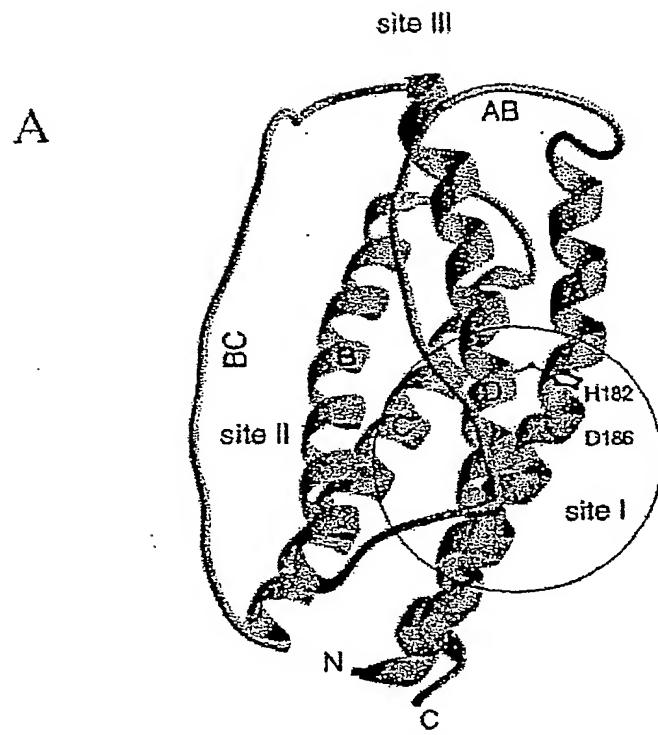


Figure 25A

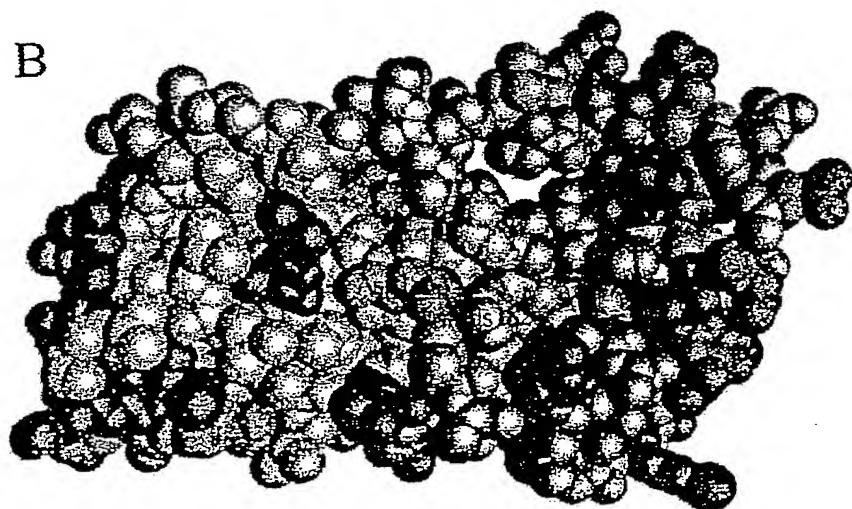


Figure 25B

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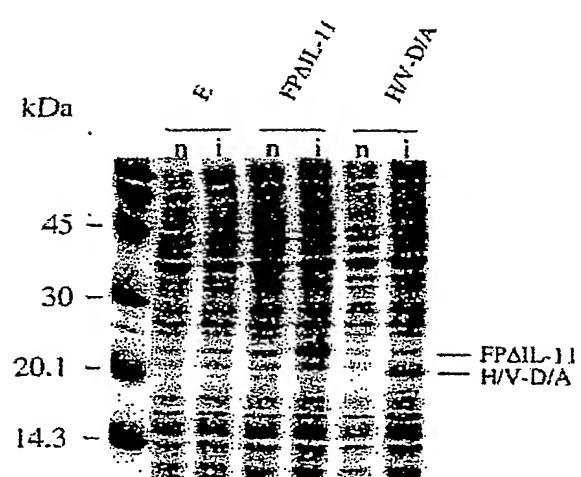


Figure 26

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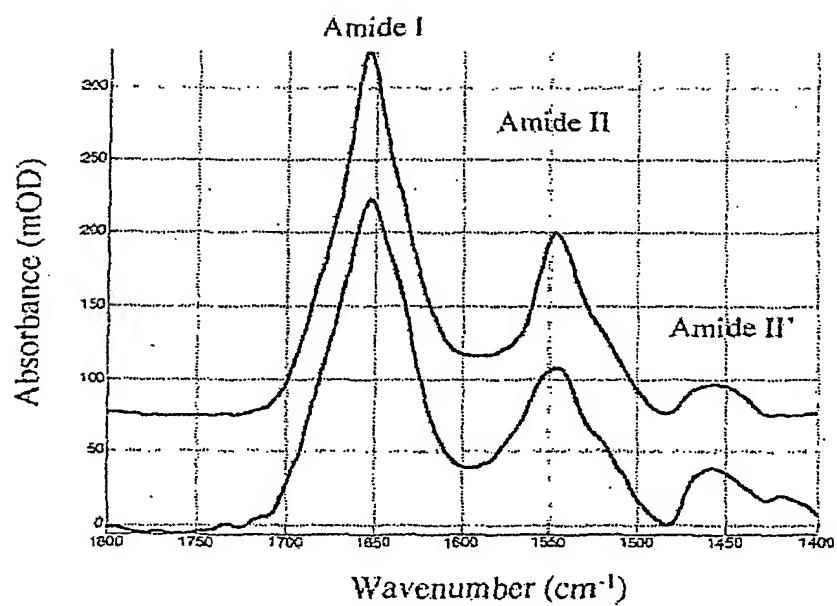


Figure 27

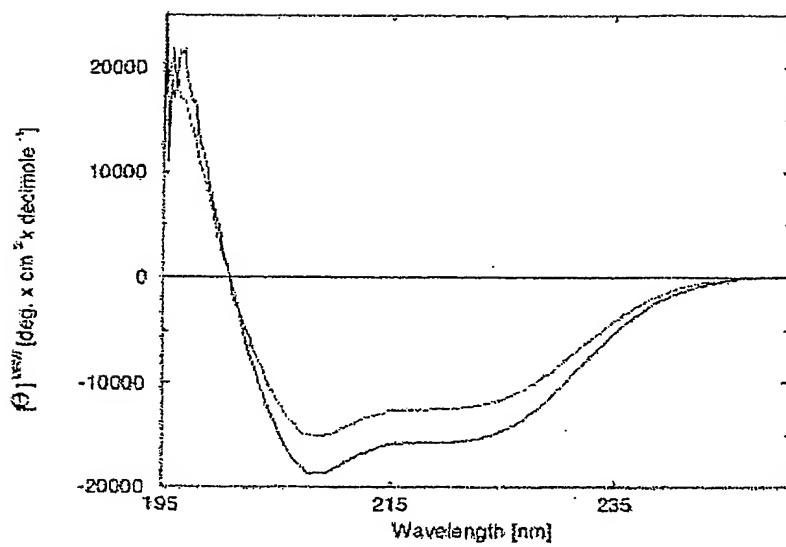


Figure 28

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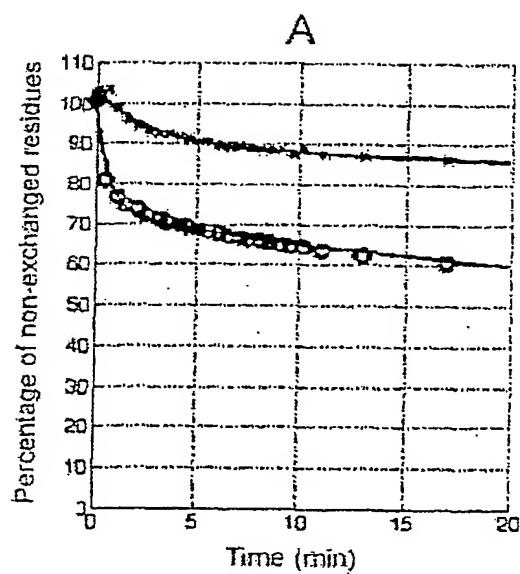


Figure 29A

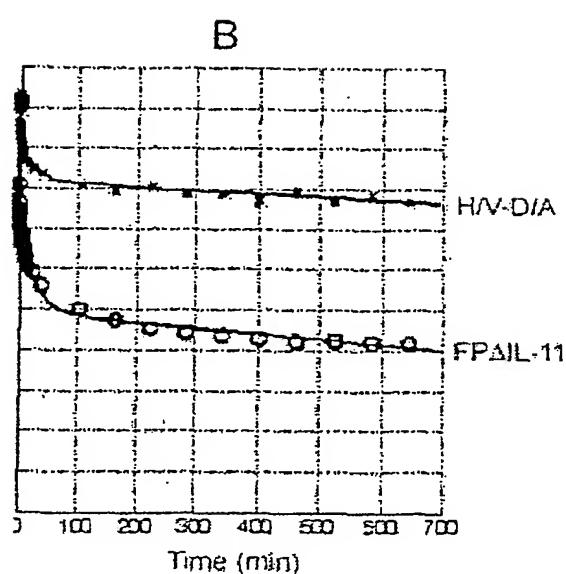


Figure 29B

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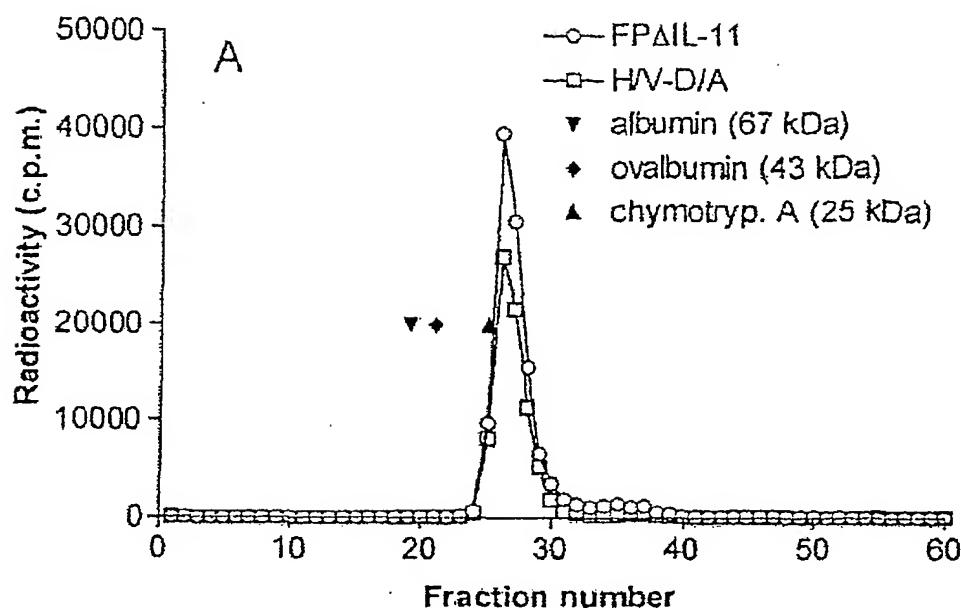


Figure 30A

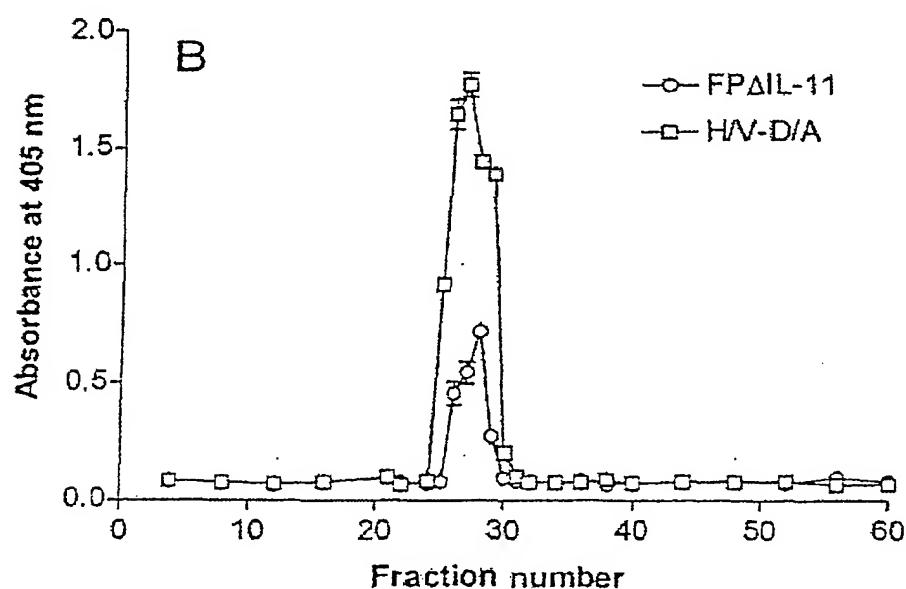


Figure 30B

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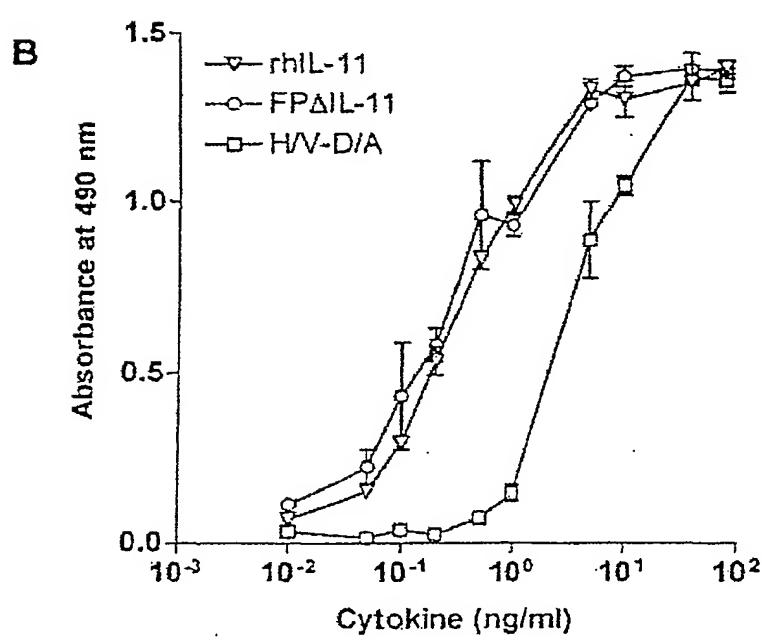
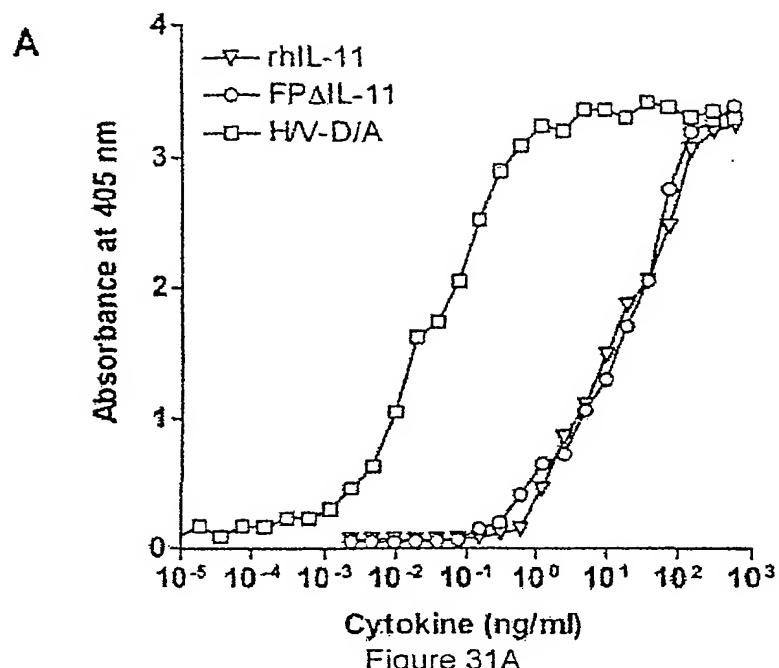


Figure 31B

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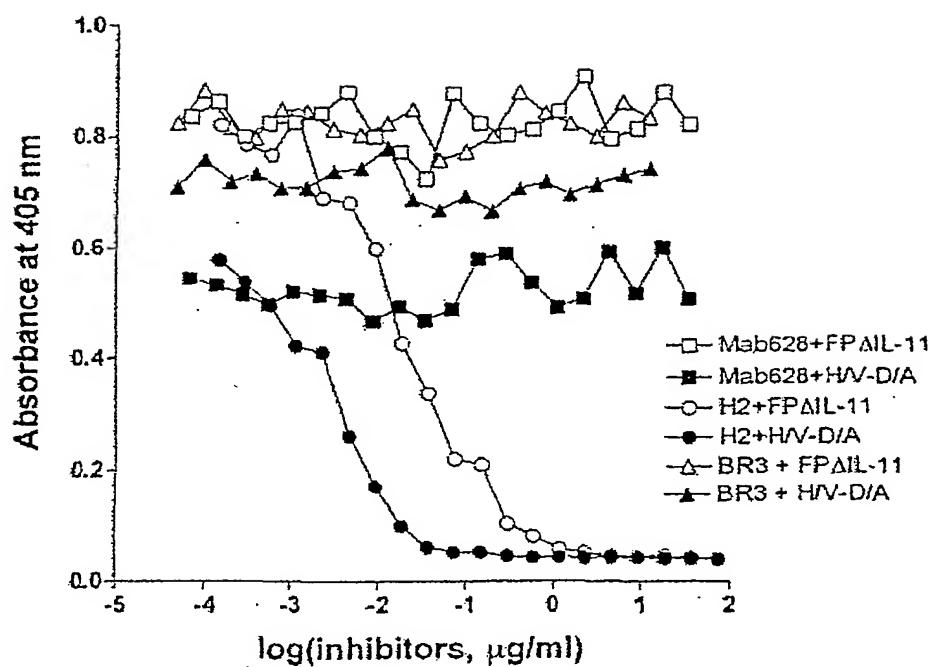


Figure 32

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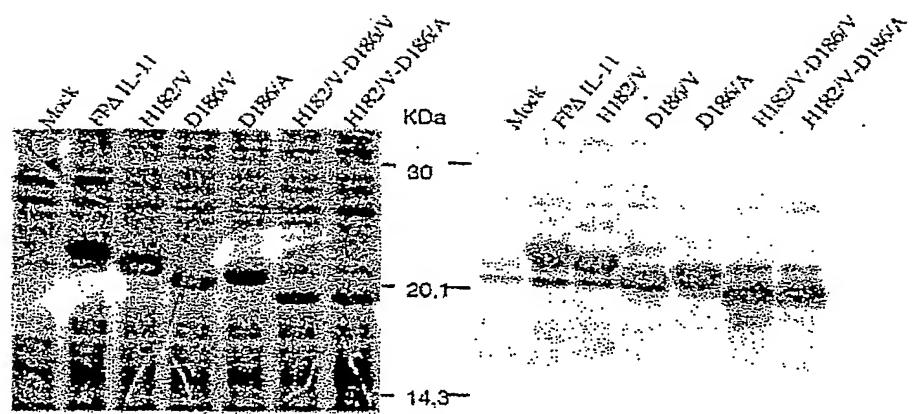


Figure 33

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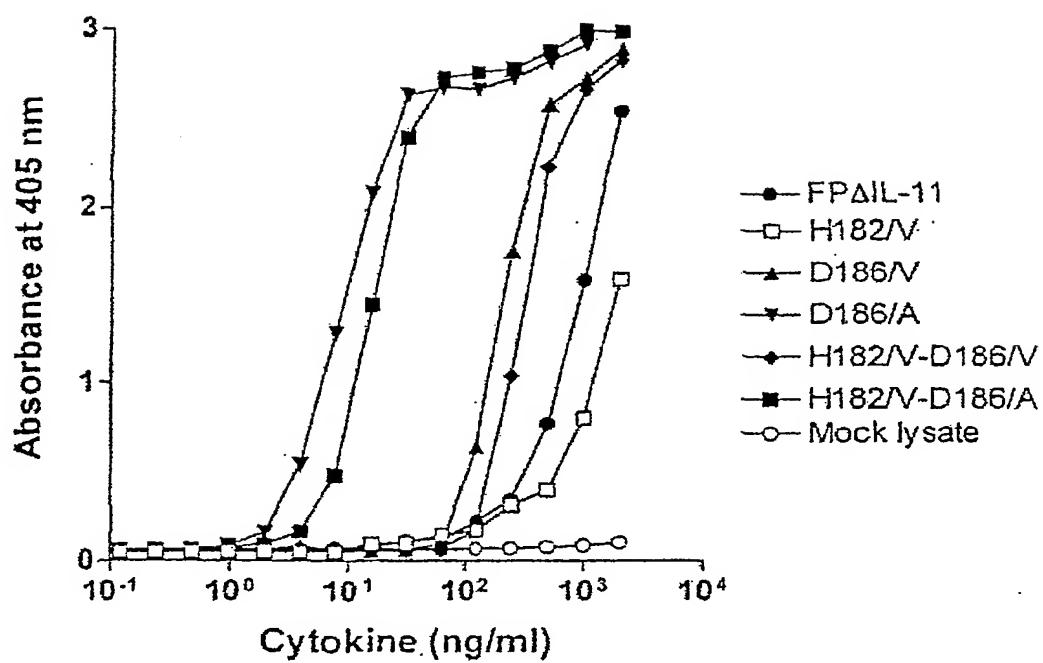


Figure 34

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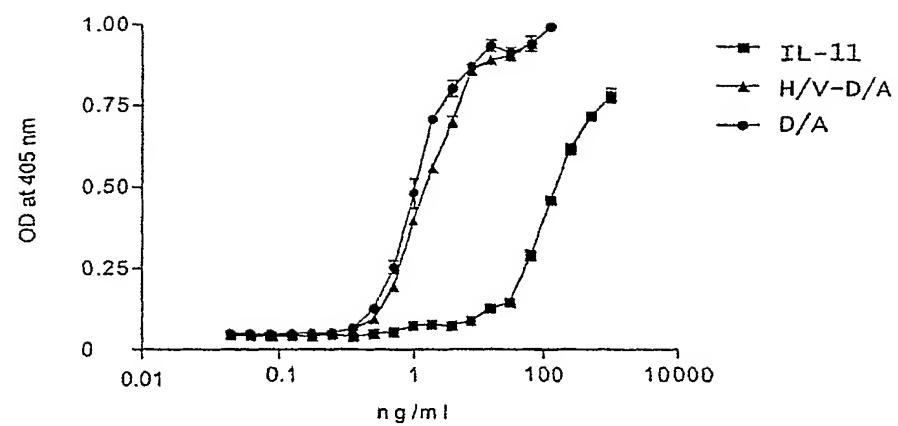


FIGURE 35

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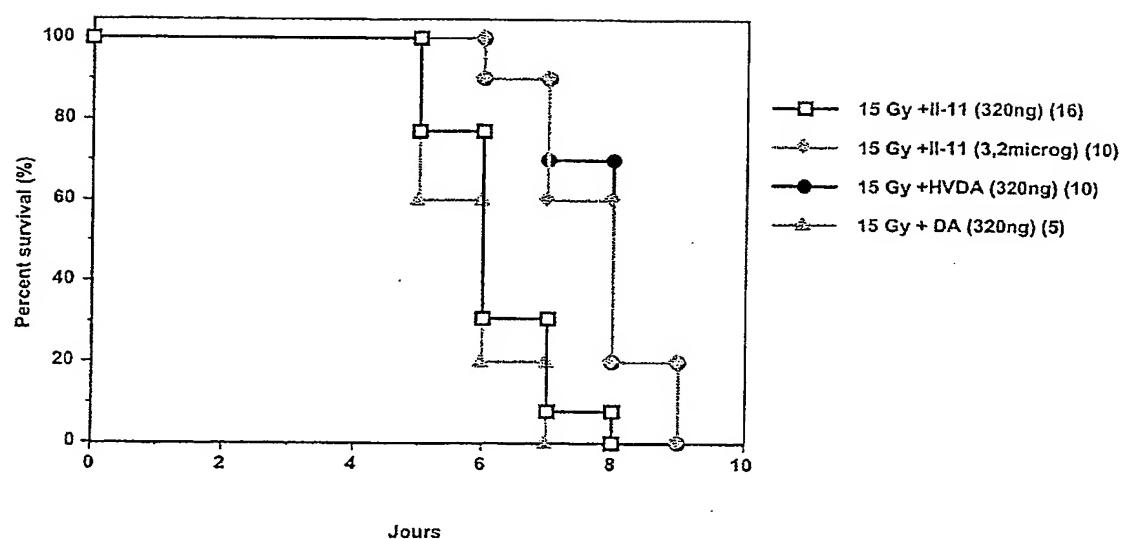


FIGURE 36